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Siboga-Expeditie

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THE

DECAPODA OF THE SIBOGA EXPEDITION

PART II

Family ALPHEIDAE

BY

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TO THE MEMORY

OF HIS HIGHLY ESTEEMED AND BELOVED PARENTS

THIS WORK IS DEDICATED

BY

THE AUTHOR.

PART II

Family ALPHEIDAE

It is especially to the important investigations of Professor COUTIÈRE that science is indebted for the fact that our knowledge of the Family *Alpheidae* has increased to such a great extent, not only as regards the morphology and the biology of these interesting animals, but also in view of the considerable number of new genera, new species and new varieties with which he has made us acquainted. COUTIÈRE also first called attention to the great importance of the relative measurements of the thoracic appendages and of the telson as specific characters, characters that previously had been overlooked by the carcinologists and it was just by means of these new characters, that often specimens of small size of *Alpheus* or *Synalpheus* proved to belong to species that were still unknown, while formerly such specimens usually would be regarded as juvenile forms or at most as varieties.

At present not less than 19 genera are included in this family, one of which, however, *Racilius* Paulson, is regarded by COUTIÈRE as doubtful, while the genus *Parathanas* Sp. Bate has been created for specimens that apparently were still in a larval stage. The genus *Aretopsis* is the only new one, discovered by this expedition. Excepting the old genus *Alpheus* and the genus *Synalpheus*, that previously was united with the former, all these genera are represented by few species and nine of them even by one species only. The genera *Alpheus*, *Synalpheus*, *Ogyris*, *Automate*, *Alpheopsis*, *Betaeus*, *Jousseaumea* and *Athanas* are distributed not only over the Indopacific region, but occur also in the Atlantic or on the coasts of America, the Mediterranean or the Black Sea and *Alpheopsis Haugi* Cout. inhabits a freshwater lake of the French Congo at 200 kil. from the sea. The other genera of this family are confined to the Indopacific region. While all the first mentioned genera were collected by the "Siboga", of the latter only *Arete* and *Aretopsis* have been observed.

As regards the distribution of the other genera, we know that *Athanopsis* Cout., *Pterocaris* Heller, *Parabetaeus* Cout., *Amphibetaeus* Cout. and *Racilius* Paulson have up to the present time only been observed in the Red Sea or at Djibouti; the remarkable genus *Cheirothrix* that was discovered by the "Challenger", occurs at Cape York, the genus *Alpheinus* Borr. at the Loyalty Islands and *Metabetaeus*, finally, is still only known from the island of Funafuti. The three last named may perhaps once prove to exist also in the East Indian Archipelago, like also the two species of *Parathanas* Sp. Bate, that occur at the Philippine Islands.

	Total number of indopacific species and varieties known at present.	Total number of species and varieties collected by the "Siboga".	Total number of new species and varieties.
Ogyris Stimps.	2 sp.	1 sp.	1 sp.
Automate de Man.	5 sp.	2 sp.	1 sp.
Athanas Leach	12 sp., 1 var.	5 sp.	4 sp.
Parathanas Sp. Bate. . . .	2 sp.		
Athanopsis Cout.	1 sp.		
Jousseaumea Cout.	5 sp.	2 sp.	2 sp.
Amphibetaeus Cout.	1 sp.		
Arete Stimps.	6 sp., 1 var.	2 sp., 1 var.	1 sp., 1 var.
Aretopsis de Man	1 sp.	1 sp.	1 sp.
Betaeus Dana	3 sp.	1 sp.	1 sp.
Parabetaeus Cout.	1 sp.		
Metabetaeus Borr.	1 sp.		
Alpheopsis Cout.	8 sp., 1 var.	4 sp.	4 sp.
Pterocaris Heller	1 sp.		
Cheirothrix Sp. Bate. . . .	1 sp.		
Alpheinus Borr.	1 sp.		
Synalpheus Sp. Bate	62 sp., 15 var.	38 sp., 9 var.	22 sp., 7 var.
Alpheus Fabr.	128 sp., 19 var.	57 sp., 10 var.	20 sp., 9 var.
Racilius Paulson	1 sp.		
Total	242 sp., 37 var.	113 sp., 20 var.	57 sp., 17 var.

Ogyris Stimps.

The remarkable genus *Ogyris*, distinguished by its elongate and slender eye-peduncles from all other Alpheidae, was hitherto represented by one indopacific and two atlantic species; a fourth, *O. Sibogae*, has been collected by this expedition. This species with its quadriarticulate carpus appears closely related to *O. occidentalis* from the mouth of the river Tocantins, but it differs by the smaller number of teeth on the dorsal carina of the carapace and by the shape of the telson. *Ogyris Sibogae* was collected in rather deep water off the Sulu Islands and also probably inhabits the Saleh-bay, Sumbawa, though the specimen from the latter locality may perhaps once prove to belong to a distinct species. *O. orientalis* Stimps. has been observed in the China Sea and in the Bay of Kagoshima. Of the american species, one inhabits the coast of Virginia, the other the mouth of the river Tocantins.

Key to the species of the genus *Ogyris*.

a_1 Carpus of second pair of legs triarticulate.

b_1 Carapace smooth, without dorsal carina; rostrum very small . . *alphaerostris* Kingsley
(J. S. KINGSLEY, in: Proc. Acad. Nat. Scienc. Philadelphia, 1879, p. 420, Pl. XIV, Fig. 7).

b_2 No rostrum, but the carapace with a dorsal carina armed with 4 or 5 small teeth . . . . . *orientalis* Stimps.
(W. STIMPSON, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 36).

a_2 Carpus of second pair of legs quadriarticulate. Rostrum present, small.

b_1 Dorsal carina of carapace with 7—9 teeth. Lateral margins of telson without a prominence . . . . . *occidentalis* Ortm.
(A. ORTMANN, in: Ergebnisse der Plankton-Exped. II, Kiel und Leipzig, 1893, p. 46, Taf. III, Fig. 4).

b_2 Dorsal carina of carapace with 4 teeth. Lateral margins of telson with an obtuse prominence just before the middle . . . . . *Sibogae* de Man

† 1. *Ogyris Sibogae* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 318.

Stat. 102. July 1. 6° 4'.1 N., 120° 44' E. Sulu-Sea. 535 m. Fine, yellow sand. Dredge full of fine yellow sand; nearly no animals. 1 specimen.

Stat. 313. February 14/16. Anchorage East of Dangar Besar, Saleh-bay. Depth up to 36 m. Sand, coral and mud. 1 specimen.

This species closely approaches to *O. occidentalis* Ortm. from the mouth of the river Tocantins. The following description is drawn from the adult specimen collected at Stat. 102,

but the corresponding measurements of the other, that has a much smaller size, are placed in parenthesis.

Rostrum triangular, acute, twice as long as wide in the middle, reaching a little beyond the extra-orbital angles, its lateral margins diverging backward and beset with short setae; the upper side which is slightly curved downward, bears three longer setae near the tip. In a lateral view the straight, lower margin of the rostrum appears to run horizontally forward. The rostrum is continued backward as a low, rounded crest or carina that extends to the middle of the carapace, gradually disappearing; the crest bears four spiniform teeth, the first or hindmost is the smallest, the second and the fourth are of equal length, one and a half as long as the first, while the third is slightly longer than the second or the fourth. External angles of the orbits rounded; at a short distance beneath them, the antero-lateral margin which is also fringed with short setae, bears a small, subacute prominence that probably represents the antennal tooth. Pterygostomian angle obtuse. The carapace is distinctly pubescent anteriorly, perhaps also posteriorly.

Abdominal pleura rounded posteriorly, except those of the 6th segment that are acute, though not articulate or movable; this 6th segment appears elongate with a rounded upper border and just twice as long as thick, when looked at from above.

Telson as in *O. occidentalis*, but the lateral margins bear, just before the middle, an obtuse prominence or tooth, which in the species from the river Tocantins is apparently wanting (A. Ortmann, l.c. Fig. 4*z*). The length of the telson equals 3,4-times the width of the posterior margin, i. e. the distance between the postero-lateral angles, and the proportion between this distance and the width at the base is 1,76. Posterior margin as in *O. occidentalis*, very prominent and rounded, its length being three-fifths the distance between the postero-lateral angles; the longer, internal spinules reach as far as the extremity of the telson, but the outer are very short. The spinules of the upper surface are small, measuring one-sixth the width of the posterior margin and are rather far remote from the lateral margins; those of the anterior pair are implanted in the middle, those of the posterior just twice as far from the end of the telson as from the anterior pair. The outer uropods of the caudal fan are much longer than the telson, narrow, curved outward and their extremity is acute; the inner are still narrower, obtuse at the tip and reach to midway between the end of the telson and that of the outer uropods.

Unfortunately in this mutilated specimen the third antennular article with the flagella, as well as the antennal flagella are missing. The very slender eye-peduncles, that are thickened at both extremities, reach with half the length of their black, facetted eyes beyond the extremity of the second antennular article, but they are almost as much shorter as the carpocerite as the eyes are long; the eye-peduncles are a little less than half as long as the carapace, the length of the latter being in proportion to that of the peduncles as 1 : 0,43. The first or basal antennular article reaches to the middle of the eye-peduncles and, measured from the base of the rostrum to the end of the article, appears just twice as long as the second or median article, which is nearly 3-times as long as thick and rather slender. Like in *O. occidentalis* Ortm. the stylocerite terminates in two strong, acuminate spines; the outer spine reaches to the distal fifth part of the basal antennular article, the inner is a little shorter and slightly directed upward.

Basicerite armed at the infero-external angle with two small, acute spines of equal length. Carpocerite slender, 5-times as long as thick and probably about as long as the antennular peduncle. Scaphocerite small, hardly reaching beyond the middle of the carpocerite, semi-elliptical; its distal extremity is acute, though it does not terminate, as usually, in a tooth, more or less distinct from the scale and the scaphocerite reaches as far forward as the distal end of median antennular article.

The two last joints of the external maxillipeds are missing, the long and slender, antepenultimate joint extends to the apex of the second antennular article. The legs of the first pair are equal, feeble and resemble those of *O. occidentalis*. The short ischium shows a small notch or emargination near the base of the lower margin. Merus slender, unarmed, 5,1 (4,3)-times as long as wide, with a few setae on the lower margin. The carpus that gradually thickens towards the distal extremity, is but very little longer than the merus and 5,3 (4,2)-times as long as thick at the distal end. The carpus bears some long, fine setae and one observes more numerous, shorter, and feathered setae distally, at the inner side. Chelae small, their length measuring five-sevenths (six-sevenths) of the carpus, they are turned outward, the dactylus being external; fingers slightly gaping, one-third (five-sevenths) longer than the palm, which is almost one and a half as long as broad. The palm is slightly wider near the articulation of the fingers than proximally and is deeply emarginate along the proximal half of its inner border; there are many short, feathered setae near that emargination, on the lower surface. The fingers, the pointed tips of which are crossing one another, show entire cutting-edges that are unarmed and the fingers bear the usual tufts of setae.

Ischium of second legs with a small notch at the base of the lower margin. Merus slender, 9 (7,6)-times as long as wide in the middle and appearing at the proximal extremity less broad than in the middle and distally. Carpus 1,27 (1,32)-times as long as the merus, four-jointed, as in *O. occidentalis*; the segments are 1,34 (0,98) mm., 0,36 (0,3) mm., 0,3 (0,22) mm. and 0,54 (0,42) mm. long. The carpus gradually thickens from the proximal to the distal extremity; the first segment, hardly longer than the sum of the three following, is slender, 7 (7)-times as long as thick at its distal extremity, the third is the shortest of all, the fourth one and a half as long as the second. Chela just as long as that of the first pair, viz. 1,1 (0,76) mm., twice as long as the fourth segment of the carpus; fingers one-fifth (one-third) longer than the palm.

Ischium of third legs with a movable spine near the middle; merus nearly of the same length, 4 (3)-times as long as wide distally and also armed with a movable spine on the lower margin near the truncate, distal extremity. This joint and the two following show these dimensions: merus 1,42 (1,21); carpus 1; propodus 0,58 (0,66). Carpus 3 (3)-times as long as thick; propodus compressed, twice (2,2-times) as long as wide at its base, its margins fringed with long, feathered setae that extend beyond the extremity of the dactylus. Dactylus about as long, not shorter (in the other specimen a little shorter) than the propodus, straight and slender, 8-times as long as broad, with a few setae at the tip. The ischium, the merus and the carpus are also beset with feathered setae, on the carpus on the upper border only.

Legs of the fourth pair more slender than those of the third. Merus longer than the

preceding joint, slender, 6,6 (6,2)-times as long as wide at the distal end; relative dimensions: merus 1,75 (1,6); carpus 1; propodus 0,96 (0,9). Carpus 4,4 (4,5)-times as long as broad, presenting the same width almost along its whole length; propodus 6 (5,6)-times as long as wide in the middle and gradually narrowing. Dactylus measuring three-eleventhes (one-third) of the propodus, 6 (5)-times as long as broad, much narrower than the preceding joint; tip truncate, with a tuft of setae. All the joints of this leg, excepting the dactylus, are fringed, along their margins, with long, feathered setae, but they are quite unarmed.

In the specimen from Stat. 102, which is the type of this species, the fifth legs are missing.

The specimen from Stat. 313 may once prove to belong to a distinct species, but the differences are perhaps owing to the younger age. The rostrum, that appears hardly longer than wide in the middle, is much shorter than the extra-orbital angles.

The eye-peduncles, very slender, 25-times as long as thick in the middle, are comparatively longer than in the type specimen, measuring just two-thirds the length of the carapace; the eyes are one and a half, the base of the peduncles 3-times as thick or broad, looked at from above, than the middle of the peduncle.

The scaphocerite, that reaches a little beyond the middle of the eye-peduncles, shows another form than in the other specimen, the outer margin, indeed, terminates in a distinct spine at a right angle with the obtuse extremity of the scale.

As was already remarked, the measurements of the four anterior legs are indicated above in parenthesis and show that the joints are generally of a somewhat stouter form. The chela of the first legs appears a little longer with regard to the carpus, but the second legs resemble those of the type and, as in the latter, the chelae of these legs are just as long as those of the first pair. The fifth legs are present and are quite characteristic: they are much thinner and feebler than the two preceding legs. The ischium is elongate, very slender, 15-times as long as thick in the middle and but little thicker at both extremities. Merus much shorter than the preceding joint, the proportion being as 1 : 0,64; the merus very slightly thickens distally and is 8-times as long as thick at the distal extremity. The relative dimensions are: merus 2,5; carpus 1; propodus 1,3. Carpus conical, 2,6-times as long as thick at distal extremity. Propodus 3-times as long as wide in the middle and about half as wide at either extremity as in the middle; the arcuate, posterior margin with 5 or 6, feathered setae. Dactylus hardly shorter than the propodus, 7-times as long as broad proximally and slightly narrowing toward the distal extremity which is truncate and furnished with two feathered setae, as long as the dactylus itself, while three other similar setae occur on the lower margin.

The type specimen from Stat. 102 is 18 mm. long, the other 12,4 mm.; the carapace of the latter, rostrum included, is 3,9 mm. long, that of the type 5,5 mm.

Automate de Man.

The genus *Automate* de Man, established in 1888 for a species living in the Bay of Batavia, is represented in this collection by a new species, remarkable by the propodi of the

third and the fourth legs being devoid of spinules on their posterior margin and by another species that could not be determined with certainty, because the legs of the first pair are missing, but that probably ought to be referred to *Aut. dolichognatha* or *Aut. Gardineri.*

Four species are at present known to inhabit the Indopacific region: 1° *Aut. dolichognatha* de Man, observed in the Bay of Batavia, at Penang and at Djibouti, 2° *Aut. Gardineri* Cout., known both from the Western Indian Ocean and from the Pacific (Kingsmill Islands), so that this species certainly will prove to occur also in the East Indian Archipelago; 3° *Aut. Salomoni* Cout., a species still only taken at Chagos, Salomon Island and 4° the new *Aut. anacanthopus*, that occurs in the East Indian Archipelago. One species, *Aut. Talismani* Cout., occurs at the Azores and another, *Aut. Evermanni*, has been recorded by Miss RATHBUN from Porto Rico; the latter species, finally, is represented in the Bay of Panama by *Aut. rugosa* Cout.

The species of this genus are living in shallow water, the greatest depth at which this genus has been observed, being 137 fathoms, but this species, *Aut. Evermanni*, was also taken at 12 to 18 fathoms.

Key to the species of the genus *Automate.*

a_1 Rostrum very small, triangular, acute or a little larger, obtuse, but never reaching beyond the frontal margin of the carapace. Scale of the scaphocerite shorter than the median antennular article.

b_1 Rostrum very small, triangular, more or less acute.

c_1 Carpocerite slightly longer than the antennular peduncle. Scaphocerite not yet reaching to the middle of the second article; visible part of basal article clearly shorter than the eye-peduncles. Second carpal segment of second legs one and a half as long as the first. Propodus of the third legs armed with spinules on its posterior margin . . . . . *dolichognatha* de Man

(J. G. DE MAN, in: Archiv für Naturg. 53. Jahrg. 1888, p. 529, Taf. XXII, Fig. 5).

c_2 Carpocerite slightly longer than the antennular peduncle, scale of the scaphocerite reaching two-thirds the length of the second article of the antennular peduncle; visible part of basal article distinctly longer than the eye-peduncles. Second antennular article one-fourth longer than the visible part of the first. No spinules on the posterior margin of the propodus of third legs . . . *anacanthopus* de Man

c_3 Carpocerite a little longer than the antennular peduncle, scaphocerite in adults reaching two-thirds the length of second antennular article; visible part of basal article distinctly longer than the eye-peduncles. Second carpal segment of second legs 3- or 4-times as long as the first. Proportion between length and height of the large chela in the female more than 2 . . . *Evermanni* Rathb.

(M. J. RATHBUN, in: U. S. Fish Commission Bulletin for 1900, Vol. 2, Wash. 1901, p. 112, Fig. 22).

c_4 Carpocerite not longer than antennular peduncle. Proportion between length and height of the large chela in the female less than 2, the palm being just as long as high. Upper and lower margin of the palm very rugose. Second legs as in *Aut. Evermanni* . . . . . *rugosa* Cout.

(H. COUTIÈRE, in: Bull. Mus. Paris, 1902, p. 341).

b_2 Rostrum distinct, though small and rounded. Carpocerite hardly longer than the antennular peduncle. Scaphocerite just reaching beyond the middle of second antennular article. Visible part of basal article much shorter than the eye-peduncles. Second antennular article much longer than the visible part of the first. Second legs as in *Aut. dolichognatha* . . . . . *Gardineri* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 854, Fig. 127, 128).

b_3 Rostrum triangular, the obtuse tip reaching almost as far forward as the anterior margin of the carapace. Eye-peduncles therefore much shorter than the visible part of basal antennular article. Scaphocerite not reaching to the middle of second antennular article. Second carpal segment of second legs only one-third longer than the first . . . . . *Talismani* Cout.

(H. COUTIÈRE, in: Bull. Mus. Paris, 1902, p. 340).

a_2 Rostrum triangular, acute, reaching, beyond the frontal margin, to the distal third part of the eye-peduncles. Scaphocerite extending to the apex of second antennular article . . . . . *Salomoni* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 2).

† 1. *Automate* sp.

Stat. 19. March 19/21. 8° 44'.5 S., 116° 2'.5 E. Bay of Labuan Tring, west coast of Lombok. 18—27 m. River-mud, coral, coralsand. 2 egg-bearing females.
Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. Shore. 1 female with eggs.
Stat. 181. September 5/11. Ambon. Reef. 1 specimen.

It remained uncertain to which species these specimens belong, because all have lost their legs of the first pair, but they probably belong either to *Aut. Gardineri* Cout., a species observed in the Maldive Archipelago and at Kingsmill Island, or to *Aut. dolichognatha* de Man from the Java Sea.

The largest specimen is a female from Stat. 19, long 15,5 mm. The median frontal process is triangular, obtuse and resembles that of *Aut. Gardineri* (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Fig. 127*a*). Eye-peduncles also as in this species. The visible part of the basal antennular article measures two-thirds the length of the eye-peduncles and appears just half as long as the median article, when the latter is measured along its inner margin; the median article which is 3-times as long as thick, appears 3-times as long as the third article. The eye-peduncles measure but a little more than one-fourth the length of the

antennular peduncle, the invisible part included. Stylocerite as in the two cited species, as long as basal article. The carpocerite extends beyond the tip of the antennular peduncle by half the length of the third joint. The terminal spine of the scaphocerite reaches to the distal fourth part of the median antennular article, as in *Aut. Gardineri* (H. Coutière, l. c. Fig. 127*a*).

The telson apparently differs from that of *Aut. dolichognatha* by the posterior margin being less broad with regard to the length and by the posterior pair of spinules of the upper surface being situated nearer to the anterior pair (vide: J. G. DE MAN, in: Archiv f. Naturg. 53. Jahrg. 1888, Taf. XXII, Fig. 5*i*). In the other specimens, however, the two pairs of spinules are just as far distant from one another as in that figure of *Aut. dolichognatha*. The spinules of the posterior pair of the upper surface measure one-ninth, in the specimen from Ambon one-eleventh the length of the telson; the longer, internal spinules of the posterior margin, which are 4-times as long as the outer, are a little longer than the posterior margin is wide.

In the larger female from Stat. 19 the merus of the second legs is 10-times as long as wide, in the female, long 10 mm., from Stat. 86, 8,62-times; the slender carpus, which in the female from the west coast of Lombok is 19-times, in that from Stat. 86 18,3-times as long as thick at the distal extremity, appears in the former 1,43-times, in the latter 1,5-times as long as the merus. In the female from Stat. 19 the second segment of the carpus is one-fourth longer than the first and twice as long as the fifth; the first segment is just twice as long as the fourth, which is the shortest of all, the third one-sixth longer than the fourth and almost as long as the fifth; the chela measures four-fifths the length of the first segment and the fingers are very little longer than the palm.

In the female from Stat. 86 the second segment is 1,66-times as long as the first and about twice as long as the fifth; the first 1,75-times as long as the fourth, which is the shortest of all, the third one-fourth longer than the fourth and almost as long as the fifth; the chela appears in this specimen not shorter, but slightly longer than the first segment, the proportion being as 1,1 : 1.

These measurements agree fairly well with those of *Aut. Gardineri*, in which species the fourth segment is described as the shortest of all, the third and the fourth of equal length, while in *Aut. dolichognatha* the fourth and the fifth are equal and a little shorter than the third. In the other specimens the second legs are missing.

The measurements of the third legs are mentioned in Table B, unfortunately of *Aut. Gardineri* the legs of the third and following pairs have not been described. The slender carpus bears a tuft of setae at the distal extremity of both margins and there are also one or two setae at the far end of the anterior margin of the merus. The stout propodus is armed with 7 rather strong spinules, the longest of which measure two-thirds the width of the propodus; a tuft of setae at the distal extremity of the anterior margin of this joint are almost as long as the dactylus, which is half as long as the propodus. In the specimen from Ambon the propodus bears also 7 spinules, in that from Stat. 86 six and in both specimens the dactylus is a little more than half as long as the propodus.

In the ova-bearing female from Stat. 86, long 10 mm., the frontal process appears comparatively longer than in the described specimen, measuring one-third the length of the eye-peduncles; the latter are not longer, but even a little shorter than the visible part of basal

antennular article and the corneae are comparatively larger, reaching backward as far as the tip of the rostrum. The median, antennular article appears hardly one and a half as long as the visible part of the first and 3-times as long as the third; the scaphocerite reaches almost to the end of median article.

As regards the frontal and antennal region, the specimen, long 12 mm., from Ambon agrees with that from the Station 86. It is difficult to say whether the described differences exhibited by the specimens from the Stations 86 and 181 are due to a difference of age, or that these specimens belong to another species than those from Stat. 19. Compare also the measurements in the Tables A and B.

Table A.

	1.	2.	3.
Proportion between the length of the telson and the width of the posterior margin.	4,8	5,5	4,9
Proportion between the width at the base and that of the posterior margin.	3,1	3,5	3,4
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,9	2	2
Proportion between the distances of both pairs of spinules from the posterior margin	1,5	1,9	2

Table B.

		1.	2.	3.
Relative dimensions of Merus. . . . . of third legs		1,57	1,64	1,66
Relative dimensions of Carpus . . . . . of third legs		1	1	1
Relative dimensions of Propodus. . . . . of third legs		0,85	1,06	1
Proportion between the length and the width of the merus .		3,37	3,25	3,27
Proportion between the length and the width of the propodus.		4	4	4

N° 1 Stat. 19; N° 2 Stat. 86; N° 3 Stat. 181.

† 2. *Automate anacanthopus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 317.

Stat. 114. July 8. 0° 58′.5 N., 122° 55′ E. Entrance of Kwandang-bay. 75 m. Hard sand, very fine. 1 mutilated specimen, probably a female.

Stat. 193. September 13/14. Sanana-bay, East coast of Sula Besi. 22 m. Mud. 1 mutilated specimen.

Rostrum acute, very small, its length one-fifth that of the eye-peduncles, the latter as in the other species of this genus; corneae almost extending to the middle of the peduncles, that are obtusely pointed at the tips. The eye-peduncles are a little shorter than the visible part of the basal antennular article, the proportion being as 7 : 10.

Antennular peduncle rather slender; median article 3-times as long as thick in the middle, one-fourth longer than the visible part of basal article and 2,5-times as long as the third, the visible part of basal article and the two following being in proportion to one another as 4 : 5 : 2. The inner margin of the basal article has a small spine a little in front of the eyes, just at the angle where the margin is turned outward; several stiff setae are observed at the apex of the basal and of the median article. Stylocerite acuminate, a little shorter than basal article.

In the specimen from Stat. 193 which is here described, the thicker basal part of the outer flagellum consists of 11 articles, the two or three distal articles are slightly longer than thick. Carpocerite slender, 6-times as long as thick, a little longer than the antennular peduncle; the terminal spine, 4-times as long as broad at its base, of the scaphocerite extends to the apex of median antennular article and measures one-fifth the total length of the scaphocerite, while the scale reaches until to the distal third part of median article.

The measurements of the telson are indicated in Table A. Spinules of the upper surface small, those of the posterior pair measuring one-fourteenth the length of the telson and implanted, like those of the anterior, close to the lateral margins; the latter are emarginate on their proximal half. Outer angles of the posterior margin rather indistinct; the longer internal spinules are a little longer than the width of the posterior margin and measure one-fourth, in the younger specimen from Stat. 114 even one-third the length of the telson.

Table A.

	1.	2.
Proportion between the length of the telson and the width of the posterior margin.	4,5	4,7
Proportion between the width at the base and that of the posterior margin . .	3	3,4
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	2,1	1,94
Proportion between the distances of both pairs from the posterior margin . . .	2	2

The specimen from Stat. 193 has lost both chelipeds, that from Stat. 114 supports still the small one. Merus of the latter 1,4 mm. long and 3-times as long as wide, presenting its greatest width a little before the middle and narrowing more proximally than distally; upper margin with short setae that become longer toward the rounded distal extremity. Length of the carpus two-fifths that of the merus, the carpus one-third longer than thick or high at the distal end, the thickness or height being in proportion to the length as 3 : 4; the upper margin of the carpus is beset with rather long setae and ends, at the outer side, in a small, acute tooth, while a similar tooth, slightly larger, occurs at the distal end of the lower margin. The distal surface of the carpus is concave, embracing the palm, and the distal border of the inner surface is emarginate. Chela 1,93 mm. long, one-third longer than the merus and a little more than 3-times as long as the carpus; measured in the plane of the fingers, that are but slightly shorter than the palm, the chela appears 3,3-times as long as high. The distal margin of the outer (lower) surface of the palm carries a small, obtuse tooth near the base of the cutting-edge of the immobile finger. The fingers, the pointed tips of which are crossing one another, shut close together and the immobile finger appears a little higher at its base than the other. The immobile finger bears a small, tridentate lobe near the articulation, followed by a slight emargination of the cutting-edge, while one observes a very small, acute tooth at the distal end of this concavity; the following part of the cutting-edge appears entire, but there are probably still 2 or 3 small teeth near the tip. The dactylus bears a small, acute tooth opposite to the described emargination on the other finger and between this tooth and the tip 7 or 8 smaller teeth occur. The chela is fringed with rather long setae, near the upper margin of the palm and dactylus, at the inner side.

The external maxillipeds and the legs of the second pair are missing in both specimens. The measurements of the third legs are indicated in:

Table B.

		1.	2.
Relative dimensions of	Merus	2,14	2
	Carpus	1	1
	Propodus	1,34	1,33
Proportion between the length and the width of the merus		5	3,82
Proportion between the length and the width of the carpus		3,6	3,3
Proportion between the length and the width of the propodus		6,2	5,3

of third legs

N° 1 Stat. 114; N° 2 Stat. 193.

These third legs are characteristic, because the propodus which narrows rather much distally, appearing one and a half as wide near the carpal articulation as at the distal extremity, is devoid of spines on its posterior margin; this margin carries, however, especially on the middle third, several rather stout and long setae, and four or five occur also at the distal extremity; a few shorter setae exist on the anterior margin and on the outer side. The dactylus measures almost two-thirds of the propodus, the proportion being as 1 : 1,7 in the specimen from Stat. 193 and as 1 : 1,6 in the other; the dactylus is tapering, slender, slightly curved, 6-times as long as thick at base. Relative dimensions of the fifth legs in the specimen from Stat. 193: merus 1,7; carpus 1; propodus 1,5. Merus 6,6-times as long as wide, carpus 4-times, propodus 7,3-times; proportion between the length of the dactylus and that of the propodus as 1 : 2,2, the dactylus being almost half as long as the preceding joint.

In the tube containing the specimen, long 9 mm., from Stat. 114, are lying two eggs, that probably belong to it; these eggs are 0,57 mm. long. The length of the other specimen is perhaps 9,5 mm.

Remarks. *Automate anacanthopus* differs from *Aut. dolichognatha* de Man and *Aut. Gardineri* Cout. by the propodi of the third and following legs bearing no spines on their posterior margin; it remains uncertain whether it differs also from the other species by this character, because nothing is known about the presence or absence of spines on their legs. *Aut. Salomoni* Cout. is distinguished by the longer rostrum, the longer stylocerite, the longer scaphocerite etc. *Aut. Talismani* Cout., *Aut. rugosa* Cout. and *Aut. Evermanni* Rathb. are no doubt also other species.

Athanas Leach.

The genus *Athanas*, no species of which are known to inhabit the coasts of America, was hitherto represented by 10 species: 5 belonging to the *Nitescens* group of Coutière, in which the chelae of the first pair are directed straight forward, 5 to the *Dimorphus* group, in which these chelae with their carpi are directed backward, enclosed by the excavate meri. The first described species, *Ath. nitescens* Leach, is one of the two that do not occur in the Indopacific; it ranges from Christiania Fjord (Lat. 60°) to the Cape Verde Islands, inhabiting the coasts of England and of France, the Mediterranean and the Adriatic seas. Pearson lately recorded

this species from Cheval Paar, Ceylon, which record, indeed, should be very interesting, but I am not quite sure whether his species should not belong to *Ath. Naifaroensis* or *Ath. areteformis*. *Ath. veloculus* Sp. Bate, collected by the "Challenger" also at the Cape Verde Islands, is considered by COUTIÈRE as a variety of *Ath. nitescens*. The other atlantic species is *Ath. Grimaldii* Cout., a form inhabiting the same Archipelago and observed also at Belle-Isle; this species, described quite lately, is remarkable by the extraordinary development of the Appendix masculina on the 2nd pleopods of the male. *Ath. Naifaroensis* Cout., of which only the female is known, inhabits the Maldive Archipelago; in this species the supra-corneal tooth is more strongly developed than in the two european species and the carpus of the first pair of legs is shorter, when compared with the merus. Closely related to this species is *Ath. areteformis* Cout. from the same Archipelago, which chiefly differs by the absence of the infra-corneal spine. The fourth species of this group is *Ath. Granti* Cout. from the South Adelaide coast, which differs from the preceding by the lack of a supra-corneal tooth and especially by the dactyli of the three posterior legs being distinctly biunguiculate.

To the other group belongs in the first place *Ath. dimorphus* Ortm., which has given its name to the group. This species inhabits the Red Sea (Suez) and has also been observed at Perim, Djibouti, Dar-es-Salaam, even at the shores of New Caledonia and perhaps at those of the Fiji Islands. A variety *monoceros* Heller occurs in the Red Sea. *Ath. Minikoensis* Cout., of which only the female was hitherto known, differs from *Ath. dimorphus* by the carpus of the first pair of legs being much shorter than the merus and than the chela: this species occurs at Minikoi Atoll and was captured by the Siboga Expedition near the island of Siau and on the west coast of New Guinea. The third, *Ath. Haswelli* Cout., from the South Adelaide coast, is closely related to *Ath. Minikoensis*, but the carpus of the first pair of legs of the female (the male is unknown) is slender as in *Ath. dimorphus*. *Ath. orientalis* Pearson is also only known by the female, at least as regards the first pair of legs, and it inhabits the shores of Ceylon; this species is also closely related to *Ath. Minikoensis*, but the carpus of the first pair of legs is not conical, but has a more slender form, being almost 5-times as long as thick at the distal extremity. The fifth species is *Ath. Djiboutensis* Cout., that occurs at Djibouti, in the Maldive Archipelago, at Minikoi Island and even in the Pacific, at the shores of the island of Funafuti.

Besides *Ath. Minikoensis* Cout., four species were collected in the East Indian Archipelago by the Siboga Expedition that all proved to be new to science. *Ath. parvus*, from the south coast of Timor, is only known by the female; it belongs to the *Nitescens* group. By the biunguiculate dactyli of the three posterior legs and by the lack of a supra-corneal tooth it much approaches to *Ath. Granti*, but, while in the latter the legs of the first pair resemble those of *Ath. Naifaroensis*, in those of *Ath. parvus* the carpus appears 2,5-times as long as thick and the chela is hardly longer than the merus. Two species of the *Dimorphus* group were collected, that differ from all the other known species of this group by the dactyli of the three posterior legs being biunguiculate. In *Ath. jedanensis* from the Jedan Islands the legs of the first pair of the male resemble those of *Ath. Djiboutensis*, while those of the female are equal and much agree with those of *Ath. Minikoensis*. The other, *Ath. Sibogae*, collected at various localities of the Archipelago, has the first pair of legs much as in *Ath. Djiboutensis*.

I cannot say to which group the fourth new species, *Ath. tenuipes*, ought to be referred, because the chelipeds are missing. This species, observed at the entrance of Kwandang-bay, may, however, easily be distinguished by the very slender legs of the second to fifth pairs.

Key to the species of the genus *Athanas*.

a_1 Legs of the first pair with the carpi and the chelae directed straight forward, merus short. (*Nitescens* group).

b_1 Dactyli of three posterior legs simple. Supra-corneal spine more or less developed.

c_1 Supra-corneal spine little marked, a more or less obtuse prominence. Infra-corneal spine distinctly developed. Carpus of the first pair of legs, in the female, about twice as long as thick at the distal extremity, merus measuring two-thirds the length of the chela . . . . . *nitescens* Leach (*veloculus* Sp. Bate)

(Vide: C. HELLER, Die Crustaceen des südlichen Europa. Wien 1863, p. 281, Taf. IX, Fig. 21—23 and C. SPENCE BATE, Report Challenger Macrura, 1888, p. 529, Pl. XCVI, Fig. 1).

c_2 Supra-corneal spine quite conspicuous, prominent. Carpus of the first pair of legs, in the female, one and a half as long as thick at the distal extremity, merus measuring two-thirds the length of the chela.

d_1 Infra-corneal spine distinctly developed . . . . . *Naifaroensis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 859, Fig. 131).

d_2 Infra-corneal spine wanting . . . . . *areteformis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 860, Fig. 132).

b_2 Dactyli of three posterior legs with a small, ventral, accessory tooth, acute and conical, that makes no angle with the posterior margin of the dactylus. Legs of the first pair of equal shape in the male and in the female; carpus, in the female, even a little shorter than thick at the distal extremity, merus half as long as the chela. Appendix masculina elongate, reaching beyond the tip of the inner ramus of 2nd pleopods and inserted on the middle of the ramus. *Grimaldii* Cout.[1])

(H. COUTIÈRE, in: Bull. de l'Institut Océanogr. Monaco. N° 197. — 20 Janvier 1911).

1) In COUTIÈRE's description of *Ath. Grimaldii* the dactyli of the three posterior legs are said to be simple, but Professor COUTIÈRE wrote me afterwards the following: "Quant aux dactyles 3, 4, 5, ils possèdent évidemment une trace de division, le bord libre est très légèrement interrompu, et la partie distale de la griffe est aussi plus mince que la partie proximale, comme si on l'avait creusée latéralement". Through the courtesy of Professor LENZ of the Naturhistorisches Museum at Lübeck I was able to study 8 specimens of *Ath. Grimaldii* collected at Porto Grande, St. Vincent, Cape Verde Islands and so I could establish the fact that the dactyli terminate, at the distal third of their posterior margin, in a small, acute, conical, accessory tooth, which is separated by a narrow incision from the distal part of the dactylus and which makes no angle with the posterior margin, the tooth being directed toward the distal extremity of the joint. Properly speaking the dactyli are therefore in reality biunguiculate, though they appear simple when examined under a feeble magnifying-glass and this opinion is corroborated by the following observation. In one of the specimens, an egg-bearing female, about 12 mm. long, the accessory hook of the dactyli of the 3rd and 5th legs is directed backward, making a distinct angle with the posterior margin, about as in *Ath. Granti*, whilst in the 4th legs it shows the normal typical form: as this specimen for the rest fully agrees with the others, it must evidently be regarded as an individual variety. In this specimen the meri of the 3rd legs proved to be 3,8-times as long as wide, in another specimen, also an adult female, 4-times, and in a young specimen 3,85-times: according to the original description the proportion should be 4,6—4,9.

b_3 Dactyli of three posterior legs distinctly biunguiculate, the ventral accessory hook making a distinct angle with the posterior margin. Supra-corneal spines wanting.

c_1 Infra-corneal spine very short. Legs of the first pair of the female as in *Ath. Naifaroensis*. Dactyli of three posterior legs with the accessory hook conical, much shorter than the principal hook. *Granti* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 2).

c_2 Infra-corneal spine hardly shorter than the extra-corneal. Chela of the first pair of the female almost as long, hardly longer than the merus, carpus 2,5-times as long as thick. Dactyli of three posterior legs with the accessory hook slender, a little more than half as long as the principal hook . . . . . *parvus* de Man

a_2 Legs of the first pair with the carpi and the chelae directed backward, fitting in the elongate, excavate merus. (*Dimorphus* group).

b_1 Dactyli of three posterior legs simple.

c_1 Supra-corneal teeth wanting.

d_1 Carpus of the first pair of legs of the female slender, much longer than the chela.

e_1 Rostrum reaching until to the second antennular article . . *dimorphus* Ortm.

(A. ORTMANN, in: Jenaische Denkschriften VIII, 1894, p. 12, Taf. I, Fig. 1).

e_2 Rostrum a little longer than the antennular peduncle . . . *dimorphus* Ortm. var. *monoceros* Heller

(*Alpheus monoceros* C. Heller, in: Sitzungsber. Kais. Akad. Wiss. Bd. XLIV, Wien, 1861, p. 274).

d_2 Carpus of the first pair of legs of the female shorter than the chela.

e_1 Carpus conical, half as long as the merus; chela slightly longer than the merus. . . . . *Minikoensis* Cout.

e_2 Carpus slender, in proportion to the chela as 0,85 : 1 . . *Haswelli* Cout. *orientalis* Pearson [1])

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 2 and J. PEARSON, On the Macrura, in: Herdman's Report on the Pearl Oyster Fisheries, 1905, p. 88, Pl. II, Fig. 10).

c_2 Supra-corneal spines distinctly developed.

Legs of the first pair in the female very unequal . . . . *Djiboutensis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Lacc. Archip. 1905, p. 856, Fig. 129).

b_2 Dactyli of three posterior legs biunguiculate.

Supra-corneal spines wanting.

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1) The brief description of *Ath. Haswelli* makes it impossible to indicate a differential character between this species and *Ath. orientalis*. According to PEARSON's figure the proportion between the carpus and the chela should be in this species also 0,85.

c_1 Infra-corneal spine as long as the extra-corneal. Legs of the first pair in the female subequal, resembling the small cheliped of the male . . . . . *Sibogae* de Man

c_2 Infra-corneal spine wanting. Legs of the first pair in the female equal, resembling those of *Ath. Minikoensis* . . . . . *jedanensis* de Man

† 1. *Athanas parvus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1910, 315.

Stat. 285. January 18. 8° 39'.1 S., 127° 4'.4 E. Anchorage South coast of Timor. 34 m. On the limit between mud and coral. 1 egg-bearing female.

This species that belongs to the *Nitescens* group, is apparently closely related to *Ath. Granti* Cout. from the South Adelaide coast, but it seems to differ by the different form of the first pair of legs; it is, however, to be regretted that so few characters of *Ath. Granti* have been described.

The rostrum of *Ath. parvus* is triangular, carinate, acuminate, just reaching beyond the apex of the second antennular article and rejoining the orbital margin by a concave curve; supra-corneal spine wanting. Extra-corneal and infra-corneal spines well-developed, the extra-corneal extending by half its length beyond the eye, the other is a little shorter.

Median antennular article a little wider than long, half as long as the visible part of basal article, third a little longer than the second; the stylocerite reaches to the apex of median article. Carpocerite 3,5-times as long as thick, reaching to the apex of the second antennular article, scaphocerite as in *Ath. Naifaroensis.*

Telson 4,2-times as long as the posterior margin is wide, the latter as in *Ath. Sibogae*; proportion between the width at the base and that of the posterior margin 1,8. Anterior pair of spinules of the upper surface just before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,95; proportion between the distances of both pairs from the posterior margin 1,7. The spinules of the upper surface measure one-tenth the length of the telson.

Legs of the first pair equal, feeble. Ischium 3,4-times as long as wide, with a stiff seta at the proximal end and another just before it. Merus 1,7-times as long as the ischium and 4,4-times as long as wide in the middle, appearing here wider than at either extremity. The carpus, that measures two-thirds the length of the merus, is 2,5-times as long as thick at the distal end and the chela is hardly longer than the merus, the proportion being 1,08; measured in the plane of the fingers, the chela appears 4,4-times as long as high and the fingers that shut together and that are unarmed, are shorter than the palm, the fingers being in proportion to the length of the chela as 1 : 2,6. In *Ath. Naifaroensis*, however, the chelipeds of which should agree with those of *Ath. Granti*, the carpus appears, according to the figure (H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, Fig. 131 *c*), only half as long as the merus and not yet one and a half as long as thick, while the chela appears one and a half as long as the merus.

Merus of second legs 6,5 to 7-times as long as wide in the middle. Carpus 1,4-times

as long as the merus, and 10,5-times as long as thick at its distal extremity; first segment 5-times as long as thick at the distal extremity, shorter than the sum of the four following, the proportion being as 1 : 1,33; second segment a little shorter than the third and the fourth that are equal, the three segments longer than thick; the third and the fourth one and a half as long as thick; chela nearly as long as the first segment, hardly a little shorter, fingers as long as the palm.

Ischium of third legs with a slender spine at the base of the posterior margin. Relative dimensions of third legs: Merus 2; carpus 1; propodus 2,25. Merus 7-times, propodus 10,2-times as long as wide, the latter with 6 short spinules on the posterior margin and a longer one at the distal extremity, which is half as long as the dactylus and that measures one-seventh of the propodus. Dactylus biunguiculate, one-third the length of the propodus, slender, 7-times as long as wide near the articulation; ventral hook a little more than half as long as the dorsal or principal hook, slightly divergent, the anterior margin of the ventral hook being not parallel with that of the other; dorsal hook 3-times as wide at its base as the ventral. Following legs also biunguiculate.

Ova 0,5 mm. long.

Length of the single specimen collected 6,5 mm.

Remarks. Apart from the first pair of legs, this species much resembles *Ath. Sibogae*; the merus of the second and following legs is, however, a little more slender, as also the propodus of the three posterior legs and the dorsal hook is 3-times instead of twice as broad at its base as the other. There are, however, still more differences.

† 2. *Athanas Minikoensis* Cout.

Athanas Minikoensis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 858, Fig. 130.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 1 egg-bearing female.
Stat. 169. August 23/25. Anchorage off Atjatuning, West-coast of New Guinea. Reef. 1 adult male.

In the male from Atjatuning the rostrum agrees with COUTIÈRE's figure a and reaches almost to the apex of the second antennular article; the upper margin which is sharply carinate, is slightly directed downward. Supra-corneal spine and infra-corneal spine also as in the type, but the latter spine slightly less acute. In the female the rostrum, though reaching as far forward, appears a little broader with regard to its length.

Median antennular article one-fourth shorter than the visible part of the first and hardly longer than the third; stylocerite reaching to the distal extremity of the second article. Antennal scale as long as the antennular peduncle, terminal spine just reaching beyond it; carpocerite much shorter than the scale, 3-times as long as thick, measured at the lower side.

Telson, in the male, 3,8-times as long as the posterior margin is wide, proportion between the width at the base and that of the posterior margin 1,8; longer, internal spinules of the posterior margin only a little shorter than the latter is broad and 3-times as long as the outer, that reach as far backward as the end of the telson. Anterior pair of spinules of

the upper surface implanted a little before the middle, proportion between the length of the telson and the distance of that pair from the posterior margin 1,7; proportion between the distances of both pairs from the posterior margin 1,8.

Both in the male and in the female the legs of the first pair are unequal. In the male the left is the larger, the merus reaching as far forward as the carpocerite: this leg much resembles that of the male of *Ath. dimorphus* (H. Coutière, Les "Alpheidae", 1899, Fig. 205). Ischium 2,5-times as long as wide at the distal extremity, the straight upper margin supports at the distal extremity a movable spine, the length of which is one-fourth that of the member, another, half as long, just behind the middle and a third of the same length at the proximal extremity. The merus, vaginiform along its whole length, is 2,3-times as long as the preceding member, just 3-times as long as wide and closely resembles that of *Ath. dimorphus* Ortm. The short, conical carpus is about half as long as the ischium. The chela, one-third longer than the merus, resembles that of Ortmann's species, but one observes a small tooth on the lower margin near the carpal articulation; the chela is nearly 5-times as long as high. The fingers that measure almost one-fourth the length of the chela, shut nearly together, while their tips meet one another; the immobile finger carries one or two teeth. The dactylus which is strongly curved, appears as thick at its base as the other finger.

The other leg, in the male, much resembles the described one, but is smaller. Ischium one-third shorter than that of the large cheliped, also 2,5-times as long as wide at the distal extremity, but without movable spinules on the upper margin. Merus a little more than 3-times as long as wide, shorter than that of the large cheliped, the proportion being as 3 : 5; its shape is, however, the same. The carpus, exactly as long as in the larger leg, measures one-third the length of the merus, but the chela which is 1,4 mm. long, appears half as long as that of the larger cheliped, but only a little longer than the merus (1,29 mm.). The fingers that shut together and the cutting-edges of which are entire, unarmed, measure almost one-third the length of the chela, the proportion being 3,3; the chela is 4-times as long as high.

In the female the right leg is the larger: it apparently agrees with the description and the figure *c* of the cited paper. The ischium, 0,84 mm. long, is 3,4-times as long as broad distally, showing a more slender form than that of the larger cheliped of the male; but the three spinules of the latter are implanted in the same manner. The merus that measures 1,26 mm., appears just one and a half as long as the ischium and 3,6-times as long as wide; it appears more distinctly truncate at the distal extremity and it narrows proximally less considerably than in Fig. *c* of Coutière's paper, the greatest width being in proportion to the width at the proximal extremity as 25 : 14. Carpus exactly half as long as the merus and twice as long as thick; it is one-fourth shorter than the ischium, the proportion being as 3 : 4. Chela 1,54 mm. long, a little longer than the merus, the proportion being as 11 : 9; palm a little shorter than the merus, the proportion being as 8 : 9, fingers a little less than one-third the length of the chela, the length of the latter being in proportion to that of the fingers as 11 : 3. The fingers that are tapering and shut together, are just as long as the palm is high.

The smaller leg has a quite different form and appears more slender. Ischium

unarmed, almost 3-times as long as thick; merus 1,8-times as long as the preceding joint, cylindrical, 5-times as long as wide. Carpus 3-times as long as thick at the distal extremity, much shorter than the merus, which is 1,54-times as long as the carpus. Chela 4-times as long as high, just as long as the merus and 1,6-times as long as the carpus. Fingers measuring a little more than one-third of the chela, the proportion between the length of the chela and that of the fingers being 2,73; fingers tapering, unarmed, excepting a very small tooth just near the tip of the immobile finger.

Merus of second legs, in the male, 4,3-times as long as wide. Carpus 1,36-times as long as the merus and 9-times as long as thick near the articulation of the chela; first segment 0,84 mm. long, slender, 5,4-times as long as thick at the distal extremity; the four following segments, the three first of which are very short and equal, are together just as long as the first; fifth segment twice as long as thick distally and 0,35 mm. long. Chela 0,66 mm. long, a little more than one-third of the carpus, fingers a little shorter than the palm. In the female the merus is 4,7-times as long as wide, the carpus 1,35-times as long as the merus and 11-times as long as thick near the articulation of the chela; the first segment, which is 6-times as long as thick distally, appears a little longer than the sum of the four following, viz. 1,16-times; fifth segment measuring just one-fifth the length of the carpus, chela almost twice as long.

Ischium of third legs with a movable spine near the base; propodus in the male with 7, in the female with 6 very short spinules and a much stronger spine, 0,21 mm. long, at the distal extremity, this spine being half as long as the dactylus. Dactylus tapering, simple, 5-times as long as wide at its base, measuring in the female just one-third of the propodus, in the male a little less, the propodus being in the male 1,61 mm. long, the dactylus 0,48 mm.

Table.

		♂	♀
Relative dimensions of	Merus	1,66	1,73
	Carpus	1	1
	Propodus	1,8	1,76
Proportion between the length and the width of the merus		4,3	4,3
Proportion between the length and the width of the propodus		8	8

of the third legs

Ova numerous, small, 0,42—0,45 mm. long.

Length of the male 10,5 mm., of the female 9,5 mm.

Remarks. *Athanas Haswelli* Cout. from the South Adelaide coast is related to this species, but the legs of the first pair of the female seem to be equal, and the proportion between the length of the chela and that of the carpus is 0,85, in the small cheliped of the female of *Ath. Minikoensis*, however, 0,63.

† 3 *Athanas Sibogae* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1910, p. 314.

Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. 27 m. and less. Coral and coralsand. 3 young specimens.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. 31 m. Stone and some Lithothamnion. 1 young specimen.

Stat. 162. August 18. Between Loslos and Broken-islands, West-coast of Salawatti. 18 m. Coarse and fine sand with clay and shells. 1 specimen, probably female.

Stat. 258. December 12/16. Tual-anchorage, Kei-islands. 22 m. Lithothamnion, sand and coral. 1 specimen.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 male and 1 ova-bearing female.

Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 specimen, without the legs of the first pair.

A new species of the *Dimorphus* group, characterized, like *Ath. jedanensis*, by the three posterior legs being biunguiculate; it differs from this species at once by the well-developed, infra-corneal spine.

Rostrum in the male from Stat. 273, which is considered as the type, triangular, 3,2-times as long as wide at its base, acuminate, carinate and projecting straight forward to just beyond the apex of median antennular article. Supra-corneal spines wanting. Looked at from above, the extra-corneal spine almost reaches to the anterior margin of the eyes; in a lateral view it appears a little shorter than the eyes and the well-developed, triangular and acute, infra-corneal spine extends as far forward as the other. Along their posterior fourth part the lateral margins of the rostrum run nearly parallel and they make distinct angles with the orbital margins.

Median antennular article slightly longer than thick, hardly one-third shorter than the visible part of basal article; third article hardly longer than the second. Stylocerite acuminate, reaching to the apex of median article.

The carpocerite extends a little beyond the median antennular article and is 3,2-times as long as thick; scale of scaphocerite decidedly longer than the antennular peduncle, terminal spine just exceeding beyond it.

Telson 4,2-times as long as the posterior margin is wide, outer angles not prominent; longer inner spinules about as long as the posterior margin is wide, the short outer ones extend beyond the end of the telson. Proportion between the width at the base and that of the posterior margin 1,9—1,95. Spinules of the upper surface implanted near the lateral margins, the anterior pair a little before the middle, the proportion between the length of the telson and the distance of this pair from the posterior margin being 1,8 in the type, 1,75 in the specimen from Stat. 162; the proportion between the distances of both pairs from the posterior margin is 1,7 in both specimens. The spinules are of moderate length, those of the posterior pair measure one-tenth the length of the telson.

In the male from Stat. 273 the legs of the first pair are unequal. Measured along its upper margin, the ischium of the left cheliped, which much resembles the larger one of the male of *Ath. Djiboutensis* Cout. (H. Coutière, Alpheidae Mald. and Laccad. Archip. p. 857, Fig. 129*c*), appears one and a half as long as wide near the articulation of the merus; the upper margin is armed with five movable spinules, two at the distal extremity, the longer of which is almost half as long as the upper margin, one at the proximal extremity, measuring a little more than one-fifth the length of the upper margin and three of intermediate length

between both extremities. The vaginiform merus, which is 2,73 mm. long, resembles that of the cheliped of *Ath. Djiboutensis*; it shows its greatest width just before the proximal third, this width being slightly more than one-third the length of the member, namely 1,05 mm.; the upper margin is straight from the distal extremity until to the posterior third and then curves backward toward the ischium, like in *Ath. Djiboutensis*, the posterior margin appears somewhat like a S, running in the middle parallel with the upper margin and the merus distinctly more narrows toward the proximal extremity than toward the distal one, which is slightly excavate. Carpus very short, almost globular. Chela a little longer than the merus, appearing 3,01 mm. long when measured to the tip of the immobile finger and 3,29 mm., when the dactylus is included; palm ovoid, twice as long as high in the middle, the chela appearing 3-times as long as high, when the dactylus is included. The concave, lower margin of the immobile finger makes, at the inner side, a distinct angle with the convex lower border of the palm; this angle, a little behind the articulation of the fingers, is more prominent in the small chela than in the large. As in *Ath. Djiboutensis*, the fingers are gaping, the dactylus being strongly curved and somewhat longer than the immobile finger; the proportion between the length of the chela and that of the dactylus, measured in the direction of the axis of the chela, is as 2,76 : 1, the proportion between the length of the chela and that of the immobile finger as 3,7 : 1, the dactylus being one-third longer than the other finger when measured in the direction of the axis of the chela. The immobile finger is armed with a large, compressed, subacute tooth that extends to near the upturned tip; the anterior margin of this tooth is arcuate, convex. The dactylus bears near the base a longitudinal tooth or lobe, much smaller than the tooth of the index and tridentate, and one observes three very small, conical teeth on the distal half of the finger, the first of which is a little larger than the following.

The right leg resembles the described one, but it is a little smaller and the fingers are shutting together. Ischium with 6 movable spinules, as in the other leg. The merus shows the same shape, but it is smaller, the length being in proportion to that of the merus of the right leg as 1 : 1,08. Chela also smaller, its length being in proportion to that of the right as 1 : 1,2; it is also 3-times as long as high, but the fingers that are finely denticulate along their whole length, shut close together and measure about one-third the length of the chela. Carpus as in the other leg.

The specimen from Stat. 162 is considered to be the female of this species, with some doubt, because it carries no eggs. In both chelae of the first pair the fingers are shutting together, the chelae resembling the small chela of the male; the right leg is a little larger than the left. The ischium of this leg bears eight spinules, three at the distal, one at the proximal extremity and four on the margin itself. Merus wider in proportion to its length than that of the small cheliped of the male, the proportion between length and width being 2,3, in the small cheliped of the male, however, 2,6; carpus and chela as in the latter, the proportion between the length of the merus and that of the chela is the same, but the prominent angle at the inner side of the lower border appears distinctly as a small tubercle.

Merus of second legs in the male 5,5-times as long as wide. Carpus 1,35-times as long

as the merus and 10-times as long as thick at its distal extremity; first segment 5-times as long as thick at distal extremity, shorter than the sum of the following, the proportion being as 1 : 1,22; the three following segments are equal and one and a half as long as thick; chela one-eighth shorter than the first segment, fingers slightly longer than the palm. In the specimen (a female?) from Stat. 162 the merus is 5,7-times as long as wide; the carpus is 1,3-times as long as the merus and 10-times as long as thick at its distal extremity, carpal segments and chela as in the male.

The measurements of the third legs are indicated in the Table. Propodus in the male (type) with 6, in the specimen from Stat. 162 with 7 rather short spinules, and a longer one, half as long as the dactylus, at the distal extremity. The biunguiculate dactylus measures one-third of the propodus and has a slender form, being 6-times as long as broad at its base; the ventral, accessory hook is about half as long as the dorsal or principal one, its anterior margin runs parallel with that of the other and it appears at its base just half as broad as the dorsal hook; both hooks are slender, the dorsal slightly arcuate, the other almost straight.

Table.

		1.	2.	3.	4.
Relative dimensions of the third legs	Merus	1,96	2	2	2
	Carpus	1	1	1	1
	Propodus	2,1	2,27	2,18	2,2
Proportion between the length and the width of the merus		5,7	6	6	5,7
Proportion between the length and the width of the propodus		8,3	9,7	9,6	9

N° 1 Stat. 162; N° 2 Stat. 258; N° 3 Stat. 273; N° 4 Stat. 315.

Length of the male 8,5 mm., of the specimen from Stat. 162 8,75 mm.; the ova-bearing female from Stat. 273 is hardly 7 mm. long.

† 4. *Athanas jedanensis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1910, p. 313.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 male and 3 ova-bearing females.

A new species of the *Dimorphus* group, characterized by the lack of the infra-corneal spine and by the dactyli of the three posterior legs being biunguiculate, agreeing, as regards the first character, with *Ath. areteformis* Cout. and, as regards the second, with *Ath. Granti* Cout. from the South Adelaide coast.

Rostrum triangular, carinate, acuminate and projecting straight forward almost to or just to the middle of the third antennular article, rarely, as in the largest female, to the apex of the second; rostral carina sharp. Supra-corneal spine wanting. Extra-corneal spine acuminate, reaching in the male by half its length beyond the eyes, in the female to the anterior margin of the eyes or hardly beyond it; infra-corneal spine wanting and represented, as in *Ath. areteformis*, by a slight, broad, rounded prominence of the margin.

Visible part of basal antennular article in the male a little more than one and a half as long as the second and one-third longer than the distal article; in one of the females the visible part of the basal article does not yet appear one and a half as long as the second, while in this female like also in the largest one the third article appears even a little longer than the visible part of the first: in the largest female the median article appears but a little shorter than the visible part of the first. The stylocerite reaches to the end of the median article or slightly beyond it.

Carpocerite twice as long as thick, shorter than the antennular peduncle; scale of scaphocerite as long as the antennular peduncle or, as in the male, a little longer, terminal spine twice as long as broad, just reaching beyond the scale.

Telson elongate, in the male 4-times, in the largest female 3,87-times as long as the posterior margin is wide, the latter half as wide as the width at the base; posterior margin only a little prominent, not semicircular, outer angles not prominent; the longer, inner spinules measure two-thirds the width of the posterior margin, the outer ones are half as long and reach to the end of the telson. The spinules of the upper surface are of moderate length, those of the posterior pair measure in the male one-tenth, in the adult female one-twelfth the length of the telson; anterior pair situated just behind the middle, the proportion between the length of the telson and the distance of that pair from the posterior margin being 2,1; the proportion between the distances of both pairs from the posterior margin is 1,5.

The male carries but one cheliped, that of the right side. Ischium twice as long as wide at the distal extremity, upper margin with a movable spine at the apex, that measures one-third the length of the member, two smaller spines in the middle behind one another and two at the proximal extremity. The characteristic merus, 1,61 mm. long, is almost 3-times as long as the preceding member; the distal extremity is excavate, the distal half is widened, the merus showing its greatest width at two-sevenths its length from the distal extremity; from this point it gradually narrows towards the proximal articulation, the greatest width being in proportion to the width at the proximal extremity as 40 : 17 and the greatest width, 0,56 mm., is about one-third the length of the merus. While the upper margin is nearly straight, the lower shows a S-like form. Carpus very short. Chela 2,24 mm. long, 1,4-times as long as the merus; it much resembles the small chela of *Ath. Djiboutensis* Cout. (H. Coutière, "Les Alpheidae", 1899, p. 177, Fig. 209, the left) and it appears to be 4-times as long as high, when measured in the plane of the fingers. The fingers that measure one-fourth the length of the chela, shut together; the prehensile edge of the immobile finger is armed with eight, small, acute teeth, almost along the whole length, the dactylus bears similar teeth, four of which near the articulation are a little larger than the rest. While the upper surface of the palm is rather flattened, the lower is swollen and bulging.

The chelipeds of the female are equal, very small and much differ from the described leg of the male. In the largest female the ischium is 0,56 mm. long and 2,2-times as long as broad; like in the male the upper margin carries a movable spine, long 0,155 mm., both at the proximal and at the distal extremity and two smaller spines, behind one another, in the middle; the upper margin is somewhat setose. The merus is 1,05 mm. long, almost

twice as long as the preceding member and 3,5-times as long as wide, showing its greatest width just in the middle and equally narrowing to both extremities, the distal obliquely truncate. Carpus 0,616 mm. long, but a little longer than the ischium, 0,28 mm. thick at the distal extremity, when measured in the plane of the merus, appearing about twice as long as thick; the concave, distal extremity embraces the chela. Chela 1,12 mm. long, twice as long as the ischium and hardly longer than the merus; looked at in the plane of the merus, the chela appears thickest near the proximal fourth part; the thickness here is one-fourth of the length and it tapers regularly to the extremity of the fingers. Measured in the level of the fingers, the chela appears a little higher, viz. 0,322 mm., appearing 3,5-times as long as high, while the height of the palm is in proportion to its thickness as 23 : 20; fingers tapering, a little shorter than the palm, the length of the chela being in proportion to the length of the fingers as 16 : 7. The immobile finger and the dactylus carry each a very small, acute and oblique tooth, a little farther distant from the tip than from the articulation, which teeth are of equal size; one observes a larger conical tooth just near the tip of the immobile finger, at the end of the cutting-edge, this tooth is subacute and twice as high as thick at its base and there is still another, more acute and smaller tooth which is probably placed between the other and the extremity of the finger. The dactylus, finally, bears also two teeth near the tip, but these teeth are acute, directed obliquely forward, parallel with the acute tip of the finger and are placed abreast; they are smaller than the tip of the finger, but their form and their size are the same, while they are somewhat smaller than the conical tooth of the immobile finger and of the same size as the tooth between the latter and the tip.

Merus of second legs in the male 3,75-times, in the adult female 5,75-times longer than wide. Carpus, in the male, 1,31-times, in the adult female 1,26-times as long as the merus; in the male the carpus is 7,6-times, in the adult female 9-times as long as thick at its distal extremity, near the articulation of the chela. First segment of the carpus, in the male, 3,3-times longer than thick distally and measuring two-thirds the sum of the four following; fourth segment a little longer than the second and the third that are equal; chela one-third longer than the first segment, fingers but a little shorter than the palm. In the adult female the first carpal segment is 4,5-times as long as thick distally and the sum of the four following segments is 1,22-times as long as the first segment; the three following segments are equal, and the chela is as long as the first segment, while the fingers are as in the male.

Ischium of third legs with a movable spine near the base of the posterior margin and with another less strong spine at the distal extremity of the upper margin. Merus unarmed, propodus, in the male, with six small and feeble spinules, long 0,08 mm., and with a much longer spine, long 0,16 mm., at the distal extremity, this spine half as long as the dactylus and accompanied by a smaller one; in the adult female the propodus carries eight spinules, long 0,06—0,14 mm., and the larger spinule at the far end measures 0,21 mm. The dactylus, in the adult female just one-third of the propodus, in the male a little longer, is slender, 5-times as long as wide near the articulation and it bears at the distal third a small and feeble, accessory hook; this ventral hook measures about one-fourth of the principal hook, while its width at the base is only one-fourth that of the latter.

Table.

		♂	♀
Relative dimensions of	Merus	1,9	1,82
	Carpus	1	1
	Propodus	1,92	1,93
of the third legs	Proportion between the length and the width of the merus.	4,42	5,2
	Proportion between the length and the width of the propodus.	6,7	7,7

Ova numerous, small, 0,42—0,45 mm. long.

The male is 8,5 mm. long, the largest of the three ova-bearing females 12 mm.

†5. *Athanas tenuipes* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 316.

Stat. 116. July 12. 0° 58′.5 N., 122° 42′.5 E. West of entrance of Kwandang-bay. 72 m. Fine sand with mud. 1 mutilated and probably young specimen.

This species, that belongs to those in which the supra-corneal spines are wanting and in which the dactyli of the three posterior legs are simple, may easily be recognized by the very slender form of the four posterior legs: unfortunately the legs of the 1st pair are missing.

Rostrum slender, acute, slightly directed downward, 6-times as long as wide in the middle and just reaching beyond the apex of the first antennular article; its lateral borders make distinct angles with the frontal margin. Looked at from above, the extra-corneal spines almost reach the anterior end of the eyes; in a lateral view this spine appears one and a half as long as wide at its base and slightly directed upward, though not extending beyond the eyes. Infra-corneal tooth half as long as the extra-corneal spine, small, dentiform, not longer than wide. Eyes black, distinctly facetted, almost entirely uncovered.

Measured from the base of the rostrum, the first antennular article appears slightly longer than the two following taken together; the second and the third that are subequal, are hardly longer than thick. The undivided part of the outer flagellum consists of 4 or 5 articles; the 1st and the 4th are of equal length and one and a half as long as thick, the 3rd is a little shorter and the 2nd the shortest of all, nearly half as long as the 1st. Stylocerite acuminate, reaching to just beyond the middle of median article.

Basicerite with a short spine at the infero-external angle. Carpocerite about as long as the antennular peduncle, not longer; scaphocerite slightly longer than the latter, terminal spine just surpassing the blade.

Abdomen nearly one and a half as long as the carapace, rostrum included; pleura of 6th somite acute, articulate, movable. Telson characteristic, 5-times as long as the posterior margin is wide; the latter, rather narrow, appears in the middle slightly notched or emarginate and bears at either side two long spinules, the outer spinule as long as the posterior margin is broad, the inner one and a half as long; in the narrow interspace between the inner spinules two or three setae are implanted. Width at the base twice as broad as the posterior margin. The spinules of the upper surface are half as long as the posterior margin

is wide, the anterior pair twice as far distant from the end of the telson as from the base, posterior pair nearly midway between the anterior pair and the posterior margin.

Merus of second legs very slender, 12-times as long as thick. Carpus 1,17-times as long as the merus; the first segment, 8-times as long as thick, appears a little longer than the sum of the four following, the proportion being as 1 : 0,8, and it is 0,61 mm. long; the following segments are 0,09 mm., 0,1 mm., 0,1 mm. and 0,2 mm. long. The second segment is just as thick as long, the two following almost as thick as long, the fifth twice as long as thick. Chela twice as long as the fifth segment, 3,5-times as long as broad and the fingers are one and a half as long as the palm.

The three posterior legs are very slender, thin, glabrous and unarmed, excepting the ischium of the 3rd and of the 4th pair that bears two spines, one near the base, the other in the middle. Measurements of the 3rd pair: merus 1,6; carpus 1; propodus 1,53; merus 9-times, carpus 7-times as long as thick; propodus without spinules, 14-times as long as wide. Dactylus simple, tapering, slightly curved, measuring two-fifths of the propodus and 10-times as long as thick at its base. The ischium of the fifth pair is probably unarmed. Measurements of these legs: merus 1,4; carpus 1; propodus 1,57. Merus 11-times, propodus 14-times as long as broad in the middle; carpus 8-times as long as thick distally. Dactylus three-fifths of the propodus, slightly curved, simple, tapering, 13-times as long as thick at the base. A few short setae at the far end of the propodus.

This specimen, which is probably young, is 7,3 mm. long, the carapace, rostrum included, 2,8 mm.; the rostrum measures hardly more than one-fifth the length of the carapace.

Jousseaumea Cout.

Also this genus comprises only a few species. Three species namely: *Jous. serratidigitus* Cout., *Jous. latirostris* Cout. and *Jous. cristata* Cout., occur at Djibouti, in the Gulf of Aden, a fourth, *Jous. Ortmanni* Cout., inhabits the coast of America and the fifth, *Jous. trigona* Rathb., occurs at the shores of the island of Porto Rico. Two species, referred to this genus and both new to science, were collected by the "Siboga": *Jous. Sibogae* de Man, taken near South-Lucipara-island in the Banda Sea and *Jous. hilarula* de Man from the Sea between Misool and Salawatti. These two species differ from the three that occur on the reefs of Djibouti, at once by the posterior margin of the telson being marked with a median, trapeziform notch, at either side of which only two spinules are implanted instead of four.

† 1. *Jousseaumea Sibogae* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 303.

Stat. 225c. November 8. South of Lucipara-islands. Reef. 1 female with eggs.

Rostrum triangular, one-fourth longer than wide at its base, acuminate, with the lateral margins slightly concave and extending a little beyond the middle of third antennular article; upper surface slightly convex, not carinate, in a lateral view it appears narrow or low, slightly directed downward, with the lower margin straight and the upper arcuate. Extra-corneal

teeth triangular, acute, measuring one-fifth the length of the rostrum and directed as in *Jous. serratidigitus* Cout.; their internal margin runs obliquely outward and forward and makes a right angle with the lateral margins of the rostrum. In the two other indopacific species, *Jous. latirostris* Cout. and *Jous. cristata* Cout., the internal margin of these teeth runs straight forward and makes an acute angle with the rostrum (H. Coutière, Les "Alpheidae", 1899, p. 71, Fig. 21 and 22). The upper surface of the carapace is glabrous.

Antennular peduncle stout, the second article a little broader or wider than long, about as long as the visible part of the first, third article one and a half as long as the second; distal margin of the articles a little setose. The stylocerite is subacute, extends to the middle of third article and is hardly shorter than the rostrum, while its outer margin is arcuate, convex. Antennular flagella as in the other species of *Jousseaumea*; the undivided part of the outer flagellum consists of one or two articles, inner branch about as long as the third antennular article; first article of inner flagellum twice as long as thick and twice as long as the second.

Carpocerite one and a half as long as thick at its distal extremity, reaching to the apex of second antennular article, and much shorter than the antennal scale, which resembles that of *Jous. serratidigitus* and appears as long as the antennular peduncle. Lower angle of the basicerite dentiform, acute.

Pterygostomian angle of the carapace rounded. The pleura of the 1st abdominal somite extend by half their length over the carapace, those of the 6th are immovable. Telson one-third longer than the 6th somite, much narrowed backward, the length of the telson equals 4,5-times the width of the posterior margin; proportion between the width at the base and that of the posterior margin 2,3. Outer angles of the posterior margin acute, though not prominent; the margin is notched in the middle, the notch is trapeziform and its anterior margin, which is less broad than the posterior, shows another very small, median incision. At either side of this incision a long seta is implanted; the posterior width of the notch measures two-thirds the width of the lateral parts of the posterior margin. At either side of the notch not four spinules are observed, as is the case in the other indopacific species of this genus, but only two, of which the inner longer one is about as long as the posterior margin is wide, while the other is half as long. Spinules of the upper surface small, measuring only $^1/_{20}$ the length of the telson; they are placed not far from the lateral margins, the anterior pair immediately behind the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 2,3, the posterior pair just midway between the anterior pair and the posterior margin. Uropods a little longer than the telson.

The large cheliped, on the left side, is only present and is borne in the same position as in *Jous. serratidigitus* (H. Coutière, l. c. p. 179, Fig. 212). The merus, which in this position extends a little beyond the tip of the antennular peduncle, has a slender form; looked at from the outer side it appears to become wider toward the distal extremity. This member is not straight, as in *Jous. serratidigitus,* but distinctly curved, the upper margin being convex, the lower concave; the lower face of the merus is slightly concave with the margins somewhat prominent and in the described position of the leg the merus apparently embraces the convex, lower surface of the palm. The merus therefore functions like in some

species of the genus *Athanas*, different from the other species of *Jousseaumea*. The carpus is short, conical and embraces the palm, while its distal margin is emarginate at the outer, at the upper and at the inner side. The chela, which is 2,94 mm. long, about two-thirds the length of the carapace, rostrum included, is almost 3-times as long as high (1,05 mm.); this number is the height or width of the upper (inner) surface of the palm. The outer (upper) border of the palm, which is ovoid, swollen and a little longer than the fingers, is marked with a longitudinal groove, but this groove is, perhaps, owing to desiccation. Near the carpal articulation the palm is deeply notched at the lower side, so that the inner (lower) border shows proximally an obtuse, dentiform angle; the lower (outer) face of the palm, that fits into the concavity of the merus, is more convex than the upper. The fingers, which closely resemble those of *Jous. serratidigitus*, are strongly compressed, shut close together and their pointed tips are crossing one another; they are armed, like in that species, with 9 or 10 conical teeth along the whole length of the prehensile edge, and these teeth progressively increase in size from the first at the base to the last near the tip.

Second legs nearly as in *Jous. latirostris* Cout. (H. COUTIÈRE, l. c. p. 247, Fig. 299). Merus slender, slightly bent, 8,6-times as long as wide. Carpus one-fourth longer than the merus, slender; first segment 0,85 mm. long, longer than the sum of the following, the proportion being as 1 : 0,75; second segment about one-fifth the first, as long as the third and the fourth taken together, the third and the fourth of equal length; fifth article a little longer than the second. Chela twice as long as the fifth article, almost 3-times as long as high or broad, the proportion being as 2,8 : 1; fingers a little longer than the palm.

Ischium of third legs with a movable spine at the base. Relative dimensions of these legs: merus 1,5; carpus 1; propodus 1,15. Merus unarmed, 4,3-times as long as wide, carpus 5,2-times, propodus 7,7-times; the slender carpus bears a short spinule at the far end of the lower margin, the propodus that slightly widens distally, bears only two feeble spinules, as long as the spinule of the carpus, on its posterior margin but a longer and stronger one at the distal extremity, while a short spinule occurs at the distal end of the anterior border. The dactylus, half as long as the propodus, is simple and slender, being 6-times as long as broad at its base. The following legs have lost their propodi and dactyli.

Ova 0,63 mm. long. Length 10,5 mm.

† 2. *Jousseaumea hilarula* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 304.

Stat. 164. August 20. 1°42′.5 S., 130°47′.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 2 specimens of equal size.

Carapace depressed. Rostrum triangular, acuminate, a little wider at its base than long and reaching to the apex of the second antennular article; the lateral margins are concave or, as in the other specimen, angular, the angle appearing just behind the distal extremity of the first antennular article. Lateral teeth, i. e. the extra-corneal teeth, very small and short, acute and directed as in *Jous. serratidigitus* Cout. and as in *Jous. Sibogae* de Man, their inner margins being at a right angle with the lateral margins of the rostrum. The upper surface

of the rostrum, which is slightly turned downward, shows a trace of a median carina, especially when looked at obliquely, and this carina is traceable, in one specimen, as far as the gastric region. Corneae small, at some distance from the frontal margin. Pterygostomian angle rounded.

Antennular peduncle stout, second article hardly longer than thick, twice as long as the visible part of the first article, third slightly longer than second. Stylocerite acuminate, a little shorter than the rostrum, reaching not yet to the apex of median article. The basal, undivided part of the outer flagellum consists of three articles which are broader than long, the third bearing the two flagella; the short flagellum is one and a half as long as the basal, undivided part.

Basicerite with a subacute tooth on the lower side, that reaches almost as far forward as the basal antennular article. Carpocerite of a stout shape, reaching to the middle of third antennular article and just as long as the rather broad scale of the scaphocerite; flagellum robust, shorter than the body.

Posterior angle of the pleura of the third, fourth and fifth abdominal somite rather obtuse, pleura of the sixth immovable.

Telson 1,7-times as long as the sixth somite, resembling that of *Jous. Sibogae*, the length being equal to 4,8-times the width of the posterior margin; proportion between the width of the latter and the width at the base 2,5. Posterior margin with the outer angles obtuse and with a trapeziform notch in the middle, which posteriorly appears a little less broad than the lateral parts of the margin; the anterior margin of the notch is entire and bears two feathered setae that are as long as the longer inner spinules of the posterior margin. Like in *Jous. Sibogae,* one observes at either side of the notch only two spinules, the inner longer one as long as the posterior margin is broad, while the outer is but a little shorter. Spinules of the upper surface small, implanted not far from the lateral margins, the anterior pair near the posterior third, the length of the telson being in proportion to the distance of this pair from the posterior margin as 2,8 : 1; posterior pair midway between the anterior pair and the posterior margin. In the other specimen which is a little smaller, the proportion between the length of the telson and the width of the posterior margin is 4,4; the anterior pair of spinules is situated a little more forward and the posterior a little farther distant from the anterior pair than from the posterior margin; in this specimen the longer spinules of the posterior margin are even a little longer than the latter is wide.

In both specimens the large cheliped is missing, the small cheliped resembles that which is observed in the genus *Athanas*. The ischium, twice as long as broad, carries some setae near its posterior margin. Merus twice as long as the preceding joint, slightly bent and 4-times as long as wide; its lower face appears a little concave. The carpus measures three-fourths of the merus and appears 3,4-times as long as thick at its distal extremity. The chela measures four-fifths of the merus and is but a little longer than the carpus; the palm appears slightly broader or higher, in the plane of the fingers, than thick, the proportion being as 4 : 3 and the length of the chela is in proportion to the width or the height as 2,4 : 1. Fingers shorter than the palm, the proportion being as 1 : 1,35; they do not quite shut together, are of equal height and are armed each with 3 or 4 small, conical teeth that increase in size from the proximal to the distal.

Merus of second legs very slender, 10-times as long as wide, curved a little. Carpus almost one-third (1,28-times) longer than the merus, also very slender; first segment 8-times as long as thick at the distal end, one-ninth shorter than the sum of the four following; second segment three-tenths of the first, fifth one-third longer than the second and just as long as the third and the fourth combined, the fourth a little longer than the third. Chela $1^2/_3$-times as long as the fifth segment and 3,5-times as long as broad; fingers nearly as long as the palm. The measurements, indeed, of the merus, of the carpal segments and of the chela are respectively: 1,85 mm.; 1,12 mm., 0,34 mm., 0,21 mm., 0,25 mm., and 0,46 mm.; 0,77 mm.

Ischium of third legs with a movable spine on the proximal half of the posterior margin and with another just before it on the outer surface. Relative dimensions of the third legs: merus 1,57; carpus 1; propodus 0,91. Merus 4,45-times as long as wide, its greatest width at the proximal third; carpus unarmed, slender, 5,7-times as long as thick; propodus a little shorter than the carpus, also 5,7-times as long as wide, showing its greatest width at the proximal third; the propodus bears 3 small and feeble spinules on the posterior margin and 2 at the far end one of which is longer than the preceding. Dactylus simple, short, measuring one-fourth of the propodus; its form is rather stout, the dactylus being only 3-times as long as thick at its base. Measurements of the fifth pair: merus 1,2; carpus 1; propodus 1,3. Merus 5-times as long as wide, carpus 6-times, both joints, like also the merus, unarmed; propodus 10-times as long as wide, longer than the merus, with the usual transverse tufts of setae. The dactylus resembles that of the third pair, but measures one-sixth of the propodus.

Length 13,5 mm.

Arete Stimps.

Besides two specimens of *Arete dorsalis* Stimps., one new species and one variety, also new, of *Ar. Maruteensis* Cout. were collected by this expedition. The two specimens of *Ar. dorsalis* do not fully agree with the specimen which by Professor COUTIÈRE was also referred to this species (Alpheidae Mald. and Lacc. Archip. 1905, p. 866 [1]): in the specimen from Goidu Atoll the carpocerite appears much longer than the scaphocerite and even slightly surpasses the antennular peduncle. According to STIMPSON, however, the scaphocerite is not shorter than the antennal peduncle ("antennarum appendix brevis, lata, pedunculum vix superans"), just as in the specimens captured by the "Siboga". I don't venture, however, to regard COUTIÈRE's species as different, because in the "Siboga" specimens both chelipeds are missing. The new variety of *Ar. Maruteensis* only differs by subordinate characters. The new species, finally, *Ar. Iphianassa*, approaches closely to *Ar. indicus* Cout., but the armature of the fingers of the larger chela in the male is different and there are still more differences.

A re-examination of the young specimen from Amboina preserved in the Museum of Göttingen, which specimen was referred by me in 1888 (Archiv f. Naturg. 53. Jahrg. p. 527) to *Ar. dorsalis*, proved it to belong to a new species for which the name of *Ar. amboinensis*

1) I must draw the attention to some typographical errors in this description. The merus of the third legs of *Ar. dorsalis* is said to be 3,7-times as long as wide (p. 867) and that of *Ar. Maruteensis* 3,8-times (p. 868); in the later description of the latter species (in: Bull. Muséum Paris 1905, p. 22), however, these numbers are respectively 4,6 and 2,75: here apparently correct.

has been proposed (J. G. DE MAN, in: Archiv f. Naturg. 76. Jahrg. 1910, p. 25—27). It approaches to *Ar. dorsalis* Stimps., but the telson tapers more strongly, being 6,5-times as long as the posterior margin is wide and the chela is 3,6-times as long as high [1]).

The geographical distribution of the species of this genus is the following. *Arete dorsalis* Stimps. was discovered near Hongkong and was collected by the "Siboga" on the Borneo bank and near the island of Saleyer, while, after COUTIÈRE, this species inhabits also the Maldive Archipelago, Samoa and New Caledonia. *Ar. Maruteensis* Cout. has been observed in the Paumotu Archipelago, while the new variety occurs in the sea between Mindanao and Halmaheira. *Ar. amboinensis* de Man is still only known from Amboina, *Ar. indicus* Cout. inhabits Hulule Male Atoll (Maldive Archipelago), but occurs also in the Persian Gulf and near Djibouti. This species is represented in the East Indian Archipelago by *Ar. Iphianassa*, which was observed on the reefs of the islands of Siau and of Obi Major, *Ar. Borradailei* Cout., finally, inhabits Hulule Male Atoll.

The species of this genus have not yet been observed outside the Indopacific region and inhabit the reefs and shallow water.

Key to the species of the genus *Arete* Stimps.

a_1 Supra-corneal spines present, quite conspicuous.
Dactyli of three posterior legs simple . . . . . *Borradailei* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Lacc. Archip. 1905, p. 861, Fig. 133).

a_2 Supra-corneal spines wanting or hardly marked.
Dactyli of three posterior legs biunguiculate.

b^1 Rostrum as long or almost as long as the antennular peduncle, 3-times as long as wide at its base. Merus of third and fourth legs with a well-developed tooth.

c_1 Dactylus of the large chela of the male unarmed, immobile finger with one acute tooth at the base.
Propodus of third legs almost unarmed, with only 2 or 3 spinules near the distal extremity . . . . . *indicus* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Lacc. Archip. 1905, p. 863, Fig. 134, 135).

c_2 Dactylus of the large chela of the male with a rounded tooth in the middle, immobile finger with two teeth. Propodus of third legs in the male with 12 spinules, in the female with 8. *Iphianassa* de Man

b_2 Rostrum reaching to the distal extremity of the first or the second antennular article, one and a half or at most twice as long as wide. Apical tooth of the merus of the third and the fourth legs feebly developed or wanting.

1) In the cited description the chela is described as being almost 5-times as long as high. This was, I suppose, the case in the other cheliped which is lost; in the only cheliped now still present and which is detached from the body, the chela is 2,75 mm. long (fingers included), 0,76 mm. high, and the fingers are 1 mm. long.

d_1 Telson elongate, 6,5-times as long as the posterior margin is wide, the latter about one-third the width at the base. One of the chelae 3,6-times, the other probably almost 5-times as long as high . . . . . *amboinensis* de Man

(J. G. DE MAN, in: Archiv f. Naturg. 76. Jahrg. 1910, p. 25—27).

d_2 Telson less than 5-times as long as the posterior margin is wide. Chelae about twice as long as high.

e_1 Merus of the third and the fourth legs with a small, though distinct tooth at the apex. Merus of the second legs more than 4-times as long as wide, that of the third 4—4,6-times. Rostrum about one and a half as long as wide . *dorsalis* Stimps.

e_2 Merus of the third and the fourth legs truncate at the apex, apical tooth wanting or hardly discernible. Merus of the second legs 3-times as long as wide.

f_1 Rostrum one and a half as long as wide. Merus of third legs 2,75-times as long as wide, propodus 4-times . . *Maruteensis* Cout.

f_2 Rostrum twice as long as wide at the base. Merus of the third legs 3,35-times as long as wide, propodus 5-times . . . . . *Maruteensis* Cout., var. *Salibabuensis* de Man

† 1. *Arete Iphianassa* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 312.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 1 male and 1 ova-bearing female.
Stat. 142. August 5/7. Anchorage off Laiwui, coast of Obi Major. Reef. 1 young male.

A new species of small size, closely approaching to *Ar. indicus* Cout. Rostrum acuminate, about 3-times as long as wide at its base, reaching, as in *Ar. indicus*, to the distal third part of third antennular article; anteriorly the rostrum is carinate, the rostral carina, separated by lateral grooves from the lateral margins, gradually widens backward. The lateral margins of the rostrum, which is slightly directed downward, make right, though arcuate angles with the orbital margins, that, like in *Ar. indicus*, show no trace at all of supra-corneal teeth ("denticules supra-cornéens"). Spine at the outer angle of the orbits as long as the eyes.

Third antennular article twice as long as the second and as long as the second and the visible part of the first taken together; anterior margin of the first and of the second article finely denticulate, the denticles rather acute. The outer antennular flagellum consists, both in the male and in the female, of four articles, the first of which is a little longer than thick, the three following one and a half as long as thick. Stylocerite bent, acuminate, a little shorter than the antennular peduncle. The terminal spine of the scaphocerite is a little more than twice as long as broad at its base and projects a little beyond the antennular peduncle, while the scale is slightly shorter than it; carpocerite stout, one and a half as long as wide, looked at from the lower side, and hardly as long as the antennular peduncle

(in *Ar. indicus* the carpocerite is 3-times as long as thick). The telson resembles that of *Ar. dorsalis* Stimps.; in the male it is 4-times as long as the posterior margin is wide, the latter not very prominent, outer angles acute, very short; proportion between the width at the base and that of the posterior margin 2,3. The longer, inner spinules near the outer angles measure one-third the width of the posterior margin and extend by half their length beyond the latter. Spinules of the upper surface small, implanted close to the lateral margins; those of the anterior pair, that are 0,07 mm. long, $^1/_{16}$ of the length of the telson, are placed, in the male, twice as far from the base as from the distal end of the telson. In the outer uropod the distal extremity of the outer margin is not curved outward, different from *Ar. indicus*.

Chelipeds asymmetrical in the male, symmetrical in the female. The merus of the larger (left) cheliped of the male is about twice as long as wide, the margins unarmed at apex. Carpus almost as long as the merus, a little less high than long, the proportion being as 9 : 10; the lower surface is deeply hollowed out, in order to embrace the merus and this concavity is bounded at the inner side by a crest that ends in an acute tooth; the inner surface is grooved, the groove runs parallel with the posterior margin and not far from it. Outer face triangular as in *Ar. indicus*, but the lower margin is straight; the distal margin is slightly concave and a fine, impressed line runs from the middle of that margin toward the rounded, distal extremity of the infero-external margin of the merus. Chelae turned outward, the fingers placed horizontally, the dactylus at the outer side. The large chela which is as long as the carapace, rostrum included, resembles, as regards its outer form, that of *Ar. indicus*; the palm is longer than high, the proportion being as 7 : 5, and a little longer than the fingers, measured along their axis; the lower (outer) face of the palm is slightly convex, the upper (inner) less so. The concavity of the lower border of the chela is deeper than in *Ar. indicus* and the fingers that are crossing one another, are more sharply acuminate. In *Ar. indicus* the dactylus is unarmed and the immobile finger carries but one single tooth (H. Coutière, Alpheidae Mald. and Lacc. Archip. 1905, Fig. 135*a*). In *Ar. Iphianassa*, however, the dactylus is armed with one tooth, the immobile finger with two. Just in the middle the immobile finger is armed with a strong tooth, which is directed obliquely forward and which is not acute, but obliquely truncate and at the inner (upper) side even slightly excavate; between this tooth and the articulation one observes another similar tooth, which is half as large and obtuse. The dactylus is armed, just in the middle, with a tooth that is slightly larger than the proximal, but much smaller than the distal tooth of the immobile finger; this tooth, placed between the two of the immobile finger, is as long as broad and rounded.

Merus and carpus of the small cheliped as in the large. The chela closely resembles that of *Ar. indicus* Cout. The fingers, measured along their axis, appear a little longer than the palm, which is 1,3-times as long as high, the proportion between the length and the height of the chela being 2,8. Like in *Ar. indicus*, the dactylus is unarmed, while the cutting-edge of the immobile finger is high and denticulate. Proportion between the length of both chelae 1,1, proportion between the height of the palm of the large chela and that of the smaller 1,18.

The chelipeds of the female resemble the smaller one of the male, but the high crest on the lower side of the carpus is entire, arcuate, not ending in a tooth and the fingers,

measured along their axis, are a little shorter than the palm. The left chela is slightly larger than the right, the palm of the left is precisely as long and as high as that of the small chela of the male, but, as was already remarked, the palm is a little longer than the fingers. On the lower (outer) surface of the chelae the semi-elliptical area is quite distinct; it reaches beyond the middle of the palm, the area on the larger chela being more obtuse at the far end than the other. All the chelae are marked, like in *Ar. indicus*, with a constriction on the outer (upper) margin of the palm, near the articulation of the carpus.

Second legs stouter than those of *Ar. indicus*. Merus, in the male, 3,5-times longer than wide; the first segment of the carpus, which is hardly longer than the merus and 5-times as long as broad near the articulation of the chela, is 0,48 mm. long and 3-times as long as thick distally; second segment 0,18 mm. long, third 0,14 mm., fourth 0,25 mm. Chela 0,67 mm. long, fingers a little shorter than the palm.

Relative dimensions of the third legs, in the male: merus 2,1; carpus 1; propodus 1,7; merus 1,25-times as long as the propodus, 4,3-times as long as wide and armed with a strong acute tooth, that appears a little larger than in *Ar. indicus* (Coutière, l. c. Fig. *d*). Propodus 5,5-times as long as wide; whereas in *Ar. indicus* the propodus bears only 2 or 3 spinules, one observes in *Ar. Iphianassa* 12 spinules along the whole length of the margin; these spinules are small, 0,07—0,085 mm. long, there being still a much larger spinule, long 0,14 mm., at the distal extremity. In the female the propodus carries 8 spinules besides those at the distal extremity. Measured until to the end of the dorsal hook, the dactylus proves to measure one-third of the propodus and to be 4-times as long as broad near the articulation; ventral hook half as long as the other.

Relative dimensions of fourth legs: merus 2; carpus 1; propodus 1,95. Merus 4-times as long as wide, the tooth at the distal extremity smaller than in the third pair; propodus 5,8-times as long as wide, posterior margin with 6 very small spinules, 0,028—0,056 mm. long, besides 2 or 3 larger ones at the distal extremity. Dactylus as in the third pair.

Ova of moderate size.

The two specimens are of equal size, 9,5 mm. long.

The young male from Stat. 142, the telson of which is damaged, agrees with the described specimens from Stat. 125, but it is a little smaller, hardly 8 mm. long. The spine at the outer angles of the orbits is, however, a little longer than the eyes and the third antennular article is but a little more than one and a half as long as the second and a little shorter than the second with the visible part of the first taken together. The palm of the large chela — the small cheliped is missing — appears a little longer with regard to its height than in the adult male from Stat. 125, the proportion between length and height being as 7 : 4. The fingers are toothed as in the adult male, but the tooth of the dactylus is smaller, decidedly smaller than the rounded, proximal tooth of the immobile finger and the large tooth of the latter is truncate, though not slightly excavate.

The following legs are a little more slender than in the adult, as has been observed also in other species. Merus of second legs 4,3-times as long as wide. Carpus 6,3-times as long as broad or thick at the distal extremity of the fourth segment and one-fourth longer than the

merus; first segment 0,57 mm. long and 3,6-times as long as thick at distal extremity; following segments respectively 0,14 mm., 0,13 mm. and 0,28 mm. long; chela 0,6 mm. long, comparatively shorter than in the adult, being but a little more than twice as long as the fourth segment; fingers slightly shorter than the palm.

Relative dimensions of third legs: merus 2, resp. 1,9; carpus 1; propodus 1,9, resp. 1,8. Merus 4,65-, resp. 4,7-times as long as wide, propodus 7-, resp. 6,8-times, the latter with 10 very short spinules and a somewhat longer one at the distal extremity; the short spinules are 0,056—0,07 mm. long. Dactylus a little more than one-fourth of the propodus.

† 2. *Arete dorsalis* Stimps.

Arete dorsalis W. Stimpson, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 32.
? *Arete dorsalis Pacificus* H. Coutière, in: Bull. Soc. Philom. Paris 9. V, 1903, p. 17.
? *Arete dorsalis* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 866, Fig. 136, 137.
Nec: *Arete dorsalis* J. G. de Man, in: Archiv f. Naturgeschichte. 53. Jahrg. 1888, p. 527.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 adult egg-bearing female.
Stat. 213. September 26—October 26. Pulu Pasi Tanette. Reef. 1 ova-bearing female.

These two specimens, in either of which the legs of the first pair are unfortunately missing, do not quite accord with one another: the slight differences are perhaps due to the difference of age, for the adult female from Stat. 78 is 16 mm. long, the other only 9,5 mm. Perhaps, however, these specimens may once prove to belong to different species. They show also differences from COUTIÈRE's description and figures, so that I am not quite sure whether both specimens in reality appertain to the form described by that author.

In a lateral view the carapace of the female from Stat. 78 appears hunch-backed, the upper border being arcuate and the rostrum strongly bent downward. Looked at from above the acute rostrum that reaches almost to the end of the second antennular article, much resembles the figure 136 of COUTIÈRE's paper, but the lateral margins regularly curve into the upper orbital margins, whereas in that figure they make a right angle with one another; looked at from above, the rostrum appears to be about one-third longer than wide at its base, the width at the base could not be measured exactly, because there are no angles. In a lateral view the spine at the outer angles of the orbits (épine extra-cornéenne of COUTIÈRE) hardly reaches to the middle of the eyes.

According to Professor COUTIÈRE the length of the telson should be 3,5-times the width of the posterior margin, in both specimens this proportion is indicated by a larger number, the proportion being 4,42 in the female from Stat. 78 and 4,2 in the other specimen. Posterior margin not much prominent, outer angles acute, very short; the inner longer spinules are hardly longer than the spinules of the upper surface and project by half their length beyond the posterior margin. The spinules of the upper surface are small, 0,1 mm. long, $^1/_{21}$ of the length of the telson; they are implanted close to the lateral margins on the distal half and the posterior pair is one and a half as far distant from the posterior margin as from the anterior pair.

In the female from Stat. 78 the third antennular article is nearly one and a half as

long as the second; the anterior margin of the first and of the second article is finely denticulate, but the small teeth are worn off at the tips. Outer flagellum composed of 9 articles before the bifurcation; excepting the first these articles are broader than long. Stylocerite reaching beyond the middle of third article, with the extremity rather blunt. Different from the specimen described by COUTIÈRE, the carpocerite is as long as the antennular peduncle, not longer and hardly one and a half as long as broad, when looked at from below; the terminal spine of the scaphocerite is twice as long as broad at its base and as long as the antennular peduncle, while the scale is a little shorter.

Merus of second legs 4,64-times as long as wide. First carpal segment 5,3-times as long as thick at the distal end, distinctly longer than the sum of the three following, the proportion being as 1 : 0,8; first segment 1,26 mm. long, the second 0,32 mm., the third 0,22 mm., the fourth 0,48 mm.; chela 0,95 mm. long, fingers just as long as the palm. Proportion between the length of the carpus and the width of the fourth segment 9,3. According to STIMPSON and to COUTIÈRE, the first segment should be as long as the sum of the following and the chela as long as the third and the fourth segments taken together; in COUTIÈRE'S figure, however, the first segment appears a little longer than the sum of the following and the chela a little longer than the third and the fourth segment combined.

The legs of the third pair seem to accord with COUTIÈRE's specimen, excepting the merus which in his specimens is described as being 3,7-times as long as wide, but the distal extremity and the small tooth near it are exactly similar. The propodus bears 9 spinules instead of 12, that increase in length from the proximal to the distal extremity, from 0,07 mm. to 0,175 mm. The dactylus, measured to the extremity of the dorsal hook, appears a little shorter than one-third of the propodus and just 3-times longer than wide at the base; ventral hook much shorter than the other.

In the specimen from Stat. 213 the carapace is less strongly curved above and the rostrum which is acute and extends also to the end of the second antennular article, appears 1,6-times as long as broad at its base and the lateral margins, which on their posterior half are almost parallel, rejoin the supra-orbital margin by a concave curve of short radius in such a manner as to form an acute prominence, the remnant of the "épines supra-cornéennes", which are so strongly developed in *Ar. Borradailei* Cout.; in the much older specimen from Stat. 78 this prominence has almost fully disappeared. The antero-lateral spine of the orbits (épine extra-cornéenne) is larger than in the other specimen and reaches almost to the end of the eyes. The third antennular article is one and a half as long as the second and just as long as the second with the visible part of the first taken together; the anterior margin of the first and of the second article is finely denticulate, the small teeth are acute, whereas in the other much older specimen they are more or less worn off. The outer flagellum still only consists of 6 articles before bifurcation and these articles are a little longer than thick. Carpocerite one and a half as long as thick, as long as the antennular peduncle, not longer.

Second legs a little less slender than in the other specimen and differing by the first carpal segment being as long as the sum of the following, not longer, and by the second and the third segments being equal. First carpal segment 0,63 mm. long, 4-times

as long as thick distally, second and third each 0,17 mm. long, fourth 0,31 mm.; chela 0,68 mm. long, a little longer than the second to fourth segments taken together; palm slightly longer than the fingers. Proportion between the length of the carpus and the width of the fourth article 8.

The legs of the third pair agree as regards their relative dimensions with those of the other specimen, the small tooth at the end of the merus appears a little less acute. Propodus with 10 spinules, dactylus as in the other specimen.

Table A.

	1.	2.
Proportion between the length of the telson and the width of the posterior margin.	4,42	4,2
Proportion between the width at the base and that of the posterior margin . .	2,5	2,6
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	2,8	2,6
Proportion between the distances of both pairs of spinules from the posterior margin.	1,7	1,75

Table B.

		1.	2.
Relative dimensions of Merus	of the third legs	1,94	2,2
Relative dimensions of Carpus	of the third legs	1	1
Relative dimensions of Propodus	of the third legs	1,8	2
Proportion between the length of the merus and that of the propodus	of the third legs	1,07	1,1
Proportion between the length and the width of the merus . .	of the third legs	4,1	4
Proportion between the length and the width of the propodus .	of the third legs	5,6	6

The ova of the female from Stat. 78 are numerous, small, 0,6—0,63 mm. long, those of the other specimen are a little larger and less numerous.

The female from Pulu Pasi Tanette may, as was already remarked, once prove to belong to a species different from that collected on the Borneo-bank; it differs especially by the joints of the outer antennular flagellum being longer than thick and few in number, by the second and the third segment of the carpus being equal, by the less strongly arcuate carapace, by a smaller size and by larger ova.

General distribution: Hongkong (Stimpson); Samoa (Coutière); Goidu Atoll (Coutière).

† 3. *Arete Maruteensis* Cout., var. *Salibabuensis* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 313.
Confer: *Arete Maruteensis* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 868 and in: Bull. Muséum Paris, XI, 1905, p. 18.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Depth up to 36 m. Mud and hard sand. 1 specimen.

As only one specimen, probably a young female, was collected, it is provisionally described as a new variety, but afterwards it may perhaps prove to belong to a distinct species.

This specimen is 8,5 mm. long. The acute rostrum that is turned downward and that

reaches a little beyond the first antennular article, is twice as long as broad at its base and shows therefore a more slender form than the rostrum of *Ar. Maruteensis*. At either side of the rostrum one observes a slight rounded prominence, the trace of the supra-corneal spines, which, according to the figure, are in *Ar. Maruteensis* acute.

Second antennular article one and a half as wide as long, shorter than the visible part of basal article and only half as long as the third; stylocerite curved, acute, reaching to the transverse suture of the third article. The undivided part of the outer flagellum consists of 5 articles that are broader than long. Carpocerite a little longer than the antennular peduncle, stout, one and a half as long as thick; scaphocerite as long as the antennular peduncle.

The length of the telson equals 3,5-times the width of the posterior margin, proportion between the width at the base and that of the posterior margin 1,9. Spinules of the upper surface small, measuring $^1/_{15}$ the length of the telson and placed near the lateral margins, the anterior pair a little behind the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 2,3; proportion between the distances of both pairs from the posterior margin 1,8. Posterior margin slightly convex, the outer angles obtuse; inner longer spinules measuring one-third the width of the margin.

The chelipeds are equal and closely resemble the small cheliped of the female of *Ar. Maruteensis* (H. Coutière, l. c. 1905, p. 21, Fig. 4, the left). The cutting-edge of the triangular immobile finger is finely denticulate along its whole length, that of the tapering dactylus is entire.

Second legs also as in *Ar. Maruteensis*. Merus 3-times as long as wide. Carpus 1,12-times as long as the merus, 5-times as long as thick at distal extremity; the four segments are 0,42 mm., 0,14 mm., 0,14 mm. and 0,24 mm. long. Chela 0,63 mm. long, one and a half as long as the first segment of the carpus, fingers half as long as the palm.

The following legs show a somewhat less stout shape than those of *Ar. Maruteensis*. Relative dimensions of the third pair: merus 2; carpus 1; propodus 2. The merus is 3,35-times as long as wide, but for the rest fully resembles that of *Ar. Maruteensis*, being truncate at the distal extremity, with only a minute trace of an apical tooth. Carpus twice as long as thick at the distal end. Propodus not 4-, but 5-times as long as wide, with 7 short spinules on the posterior margin and two longer ones at the far end.

Dactylus one-third of the propodus, of a rather stout shape, 2,6-times as long as broad at its base; ventral accessory hook much shorter and smaller than the principal one. The ischium appears also a little less stout than in the typical species, being one-third longer than wide distally.

The typical species has been observed at the island of Marutea (Paumotu-islands).

Aretopsis de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 310.

A new genus of the Alpheidae, closely related to *Arete* Stimps.

Looked at from above, the rostrum appears acute, triangular, carinate, without any trace of supra-corneal teeth; in a lateral view it appears strongly compressed with the tip rounded, like in the genus *Athanopsis* Cout. Extra-corneal teeth wanting, infra-corneal teeth (outer angles of the orbits) acute, dentiform. Eyes as in the genus *Arete*, cornea antero-lateral,

almost quite free and uncovered. Pterygostomian angle rounded. Pleura of the sixth abdominal somite articulate, movable.

Antennal region as in *Arete*, but the stylocerite shorter. Only one cheliped is known, and this leg agrees with the small cheliped of *Arete*. Merus short, not vaginiform; carpus short, cyathiform; chela turned outward, compressed, with both margins entire, but with a small groove on the upper (inner) face of the palm, just behind the articulation of the dactylus. Fingers shutting close together, with rather sharp, cutting-edges, that of the dactylus finely denticulate.

Legs of the second pair with the carpus 5-articulate, the five segments as in the genus *Synalpheus*, the second to the fourth being very short, equal, the first the longest, the fifth a little shorter than the first.

Ischium of the following legs with a movable spine near the base. Merus unarmed at the apex of the lower margin. Dactylus biunguiculate.

† 1. *Aretopsis amabilis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 311.

Stat. 89. June 21. Pulu Kaniungan ketjil. Reef. 1 specimen.

Looked at from above, the rostrum that extends to just beyond the first antennular article, appears acute, triangular, rather wider at its base than long, with slightly concave, divergent, lateral margins; the upper margin that projects horizontally forward, is obtusely carinate. In a lateral view, however, the rostrum appears strongly compressed laterally, like in the genus *Athanopsis*, half as high as long with rounded tip and with the arcuate lower margin curving backward and downward. There is no trace of supra-corneal or extra-corneal teeth, but, like in the genus *Arete*, the outer angle of the orbits is acute, dentiform and reaches to midway the eye; above this triangular tooth the orbital margin, i. e. the continuation of the lateral margin of the rostrum, appears concave without any prominence. Beneath the outer angle of the orbits the antero-lateral margin of the carapace is directed vertically downward and the pterygostomian angle is rounded. The upper border of the somewhat compressed carapace is straight.

The pleura of the sixth abdominal somite are articulate, movable. Telson moderately tapering, its length equals 3,5-times the width of the posterior margin, the latter half as wide as the greatest width near the base; posterior margin truncate in the middle, this truncated part just half as broad as the width of the margin. There are two spinules near the outer angles that are not prominent at all; the inner, longer spinules measure a little more than one-third the width of the posterior margin, beyond which they extend by half their length; the outer spinules measure one-fourth of the longer. The spinules of the upper surface are situated not far from the lateral margins and are rather short, measuring one-fourth the width of the posterior margin; anterior pair just before the middle, the proportion between the length of the telson and the distance between this pair and the posterior margin being 1,8; posterior pair a little farther distant from the posterior margin than from the anterior pair. Anal tubercles probably wanting. Distal margin of the uropods truncate.

Antennular peduncle as in *Arete indicus* (Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 864, Fig. 134*a*). Second article one and a half as wide as long, a little shorter than the visible part of the first, third article as long as the two preceding taken together. Stylocerite acute, reaching to the middle of median article, with the outer margin slightly bent. Outer antennular flagellum with 6 articles before the bifurcation and but a little longer than the peduncle; 1st article very short, following a little longer or just as long as thick.

Carpocerite stout, slightly longer than the antennular peduncle, a little more than twice as long as thick; flagellum rather slender, tapering. The scale of the scaphocerite is rather broad, a little longer than the antennular peduncle, with the outer margin very slightly curved and ending in a rather strong terminal spine which is twice as long as broad at its base.

External maxillipeds as in *Athanas*, penultimate joint rather short, terminal joint pointed, 4-times as long as broad at its base.

There is but one cheliped, the right, present. Ischium tolerably slender, almost 3-times as long as thick in the middle and becoming thicker at the distal extremity. Merus a little more than one and a half as long as the preceding joint, its outer face about twice as long as broad in the middle; this face rather rapidly widens from the proximal extremity to the middle and appears, near the carpal articulation, but a little less broad than in the middle. The upper margin is unarmed at the apex, but the lower bears in the middle 3 slender S-like shaped and movable spinules, nearly of equal length, and that measure about one-sixth the length of the merus; between the acute, dentiform, distal extremity and the third spinule one observes 2 or 3 setae; the distal margin that articulates with the carpus, shows a small, triangular notch, situated a little nearer to the lower than to the upper margin. Infero-internal margin unarmed. Carpus short, about as long as the ischium, cyathiform. The chela is turned outward, the dactylus even slightly directed downward. The chela is one and a half as long as the merus and the fingers are just as long as the palm; of the palm, which is one and a half as long as wide, the outer (upper) and the inner (lower) margin are entire, the latter carinate, but one observes on the upper (inner) surface a small, oblique groove, just behind the articulation of the dactylus. The fingers which are also distinctly compressed, shut close together and the pointed tips are crossing one another; the dactylus appears a little less broad than the other finger, its cutting-edge is very finely denticulate from the articulation to near the tip, but the cutting-edge of the immobile finger is entire.

Second legs as in the genus *Synalpheus*. Merus 5-times as long as wide and nearly as long as the carpus. First segment of the carpus 3,6-times as long as thick distally; following segments, taken together, 1,3-times as long as the first, the second, the third and the fourth are equal, slightly broader than long, each measuring one-fourth the length of the first; fifth segment a little more than half as long as the first. Chela slightly more than twice as long as the fifth segment, fingers as long as the palm.

Ischium of the three following legs with a small, movable spinule near the base. Measurements of the third legs: merus 2; carpus 1; propodus 1,33. The merus is unarmed at the distal extremity of the lower margin and 3,7-times as long as wide. Carpus unarmed, 3,1-times as long as thick distally. Propodus also of a stout shape, 4,66-times as long as wide,

the lower margin with 8 or 9 spinules that increase in length, the longest of the three at the apex being twice as long as the first or proximal spinule. Dactylus half as long as the carpus and $^3/_8$ of the propodus, 4-times as long as wide at the base; the ventral hook, a little shorter but almost 3-times as broad at its base as the other, has a stout shape, being only one and a half as long as broad at its base. These legs are nearly glabrous. Of the fifth legs only the three first joints are present.

Length 11 mm.

Betaeus Dana.

Only one species of *Betaeus* was collected by the "Siboga" and this species, *Bet. indicus*, is new to science; it is very closely related to *Bet. aequimanus* Dana from New Zealand, but it differs by the frontal margin being only very slightly emarginate and by the more slender propodi of the three posterior legs.

This genus comprises at present about 8 species the distribution of which is quite peculiar and limited. *Bet. aequimanus* Dana, which differs from the other species by the deep triangular emargination of the front, inhabits the seas of New Zealand, Stewart Island and the Warekauri or Chatham Islands. *Bet. australis* Stimps. occurs at Port Jackson and differs by the frontal margin being convex and by the more slender legs. The third indopacific species is the new *Bet. indicus* from the Sea of Lombok, where it lives at a depth of 18 m. At no other localities of the whole Indopacific region a representative of this genus has hitherto been observed.

The other species inhabit the west coast of America. *Bet. Harrimani* Rathb., in which the frontal margin is nearly straight, marked only with an almost imperceptible median sinus, occurs at Sitka, and, according to Miss RATHBUN, "represents a more northern latitude than any Alpheid hitherto described". *Bet. longidactylus* Lock. inhabits the coast of California from San Pedro to San Diego and *Bet. Harfordi* (Kingsley), which, according to Professor COUTIÈRE, is identical with *Bet. aequalis* (Kingsley) = *aequimanus* Lock., ranges from Point Arena to Catalina Island. Two species, finally, occur on the west coast of South America. *Bet. scabrodigitus* Dana is found on the coast of Chili and has been observed at Valparaiso, Isla de Pajaros, Bay of Arauco etc., after COUTIÈRE, however, this species should be identical with *Bet. emarginatus* (H. M.-Edw.). The second, *Bet. truncatus* Dana, has been observed on the shores of Terra del Fuego (Hermite Island) and on the west coast of Patagonia. With this species *Bet. sinuosus* (Guérin), recorded from Callao and the coast of Chili, should be identical and this should also be the case with *Bet. laevigatus* (Nicolet) from Chili.

† 1. *Betaeus indicus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 309.

Stat. 34. March 27. Anchorage off Labuan Pandan, Lombok. 18 m. Coral reef. 1 ova-bearing female and 1 young specimen.

Closely related to *Bet. aequimanus* Dana from New Zealand and representing this species

in the East Indian Archipelago, *Bet. indicus* differs at first sight by the characters of the frontal margin. While in the New Zealand species the front is deeply emarginate, "notched about as deep as the eye-sockets" (G. M. THOMSON, in: Trans. Linnean Soc. London, 1903, p. 438, Pl. 28, Fig. 1), the frontal margin appears in *Bet. indicus* very slightly emarginate; the notch or emargination is concave at the base, not angular. The orbital hoods that are rounded above, are separated from one another by a shallow triangular groove and are marked each with a fine suture, that runs from the antero-internal angle of the hoods, along their inner side, backward; the two sutures unite at the base of the eye-hoods and extend as a very narrow, linear, median groove or suture backward on the gastric region to a little beyond the anterior third of the carapace. The distinctly facetted, grayish corneae are almost entirely covered by the carapace, hardly projecting beyond the frontal margin when looked at from above; in a side view, however, they slightly extend beyond it. At the antero-internal angle of the corneae the ophthalmopods are produced forward from under the frontal margin of the carapace and armed each with a strong, acute, triangular tooth which is directed forward and laterally compressed, appearing slightly concave at the inner, slightly convex at the outer side; these produced parts of the ophthalmopods are rounded at their inner side and separated from one another by a triangular notch, at the bottom of which one observes a small, acute, median tooth, apparently the "bec ocellaire" of COUTIÈRE. Frontal and antero-lateral margin of the carapace devoid of spines or teeth, pterygostomian angle rounded.

The pleura of the second abdominal somite are very broad, those of the sixth subacute, not articulate. When THOMSON's figure 2 (l. c.) of the telson is exact, *Bet. indicus* proves to differ especially by the spinules of the upper surface being placed nearer to the lateral margins. The telson, as long as the 6th somite, is 4,5-times as long as the posterior margin is wide; posterior margin as in *Bet. aequimanus*, the outer angles appearing dentiform; proportion between the width at the base and that of the posterior margin 2,8. The spinules of the anterior pair are 0,22 mm. long, one-tenth or one-eleventh the length of the telson, and are placed just before the middle, the proportion between the length of the telson and the distance of this pair from the posterior margin being 1,9; the posterior pair is a little farther distant from the anterior pair than from the extremity of the telson. The outer spine of the basal joint of the 6th pleopods is acute, depressed, large and reaches as far as the posterior pair of spinules on the upper surface of the telson; outer uropod almost twice as long as the telson, the inner but very slightly shorter.

Antennal region nearly as in *Bet. aequimanus*. Second antennular article almost as thick as long and hardly more than half as long as the visible part of the first; third almost one and a half as long as the second; anterior margin of the first and of the second article beset with very small spinules. The outer flagellum is composed before bifurcation of 8 articles which are all very short, much broader than long, excepting the first that is twice as long; the two flagella are subequal and as long as the carapace. The stylocerite is acuminate and almost reaches to the apex of the second antennular article.

Spine at the infero-external angle of the basicerite triangular, acute, compressed, reaching almost to the apex of first antennular article. Carpocerite stout, extending beyond the antennular

peduncle by one-third of the third article; flagellum robust, tapering, one and a half as long as the carapace. Scaphocerite enlarged, the scale reaches to the middle of third antennular article, while the terminal spine, separated by a triangular notch, hardly projects beyond the rounded tip of the scale.

External maxillipeds reaching to the middle of the carpocerite.

Only the left cheliped is present, it is rather feeble. The merus which is unarmed, with the infero-internal margin somewhat setose, is 3,2-times as long as its outer face is wide and reaches until to the pterygostomian angle of the carapace; it is just as long as the telson. Carpus conical, with the antero-external margin notched in the middle. Chela one and a half as long as the merus, entirely inverted, so that the dactylus is placed inferiorly; the chela is 3,3-times as long as high in the plane of the fingers and 2,75-times as long as the latter. Fingers shutting close together, the cutting-edges with a few small, acute teeth.

Second legs rather stout. Merus 5-times as long as wide, carpus 1,3-times as long as the merus. The five carpal segments are 1,14 mm., 0,28 mm., 0,28 mm., 0,28 mm. and 0,74 mm. long; the first segment, 4-times as long as thick at the far end, is distinctly longer than the sum of the three following that are equal and just as thick as long, fifth segment twice as long as thick distally, a little shorter than the sum of the three preceding. Chela twice as long as the fifth segment, fingers a little shorter than the palm, which is just twice as long as broad. The second legs resemble those of *Bet. aequimanus* according to Dana's figure 11*a* (U. S. Explor. Exped. Crust. Pl. 35), but after Thomson's description the three middle carpal segments should, taken together, be equal to the first and last in length.

The three posterior legs evidently differ from those of *Bet. aequimanus* by the more slender propodi; the dactyli are all biunguiculate, which is also the case in *Bet. aequimanus*, according to Coutière (Les Alpheidae, 1899, p. 263, Fig. 328). The measurements of the third legs are: merus 1,8; carpus 1; propodus 1,8. Merus stout, 3,5-times as long as wide in the middle; like on the meri of the fourth and fifth pair, the posterior margin bears a movable spine near the proximal extremity. Carpus 3,4-times as long as thick distally. The propodus which is just as long as the merus, is 8,4-times as long as broad in the middle, while in Coutière's figure the propodus of *Bet. aequimanus* appears only 5-times as long as broad. The propodus bears 5 or 6 very small spinules, long 0,11 mm., and 2 that are slightly curved and 0,14 mm. long, at the distal extremity. Dactylus one-fourth of the propodus, 3-times as long as broad at its base; the slightly bent, tapering, dorsal hook is almost 3-times as long as the ventral and appears one and a half as thick at its base, notch between both hooks obtuse. In the two following legs the merus appears gradually much shorter. These legs are nearly glabrous.

Ova not very numerous, 1,05—1,1 mm. long.

This female is 20 mm. long.

The other specimen is much younger, 14,5 mm. long, and has lost the legs of the first, the second and the fifth pair; it accords with the female but the stylocerite reaches hardly beyond the middle of the second antennular article and the linear groove on the carapace extends backward to beyond the middle. This specimen was sent to Professor Coutière at

Paris, who informed me that he regarded it as a species distinct from *Bet. aequimanus* Dana, and he added that even in young individuals of DANA's species the front is deeply emarginate.

Betaeus australis Stimps. from Port Jackson is apparently also a different species.

Alpheopsis Cout.

Four species of this genus, all new to science, have been collected by the "Siboga". *Alpheopsis consobrinus* closely approaches to *Alph. aequalis* Cout., but the pterygostomian angle terminates in a small, acute tooth or spine, as in *Alph. idiocarpus* Cout. and *Alph. Chalciope* de Man, while the antennular peduncle more accords with that of *Alph. aequalis* var. *truncatus* Cout. *Alph. Chalciope*, the second of the four, also much resembles *Alph. aequalis*, as regards the first pair of legs, but the front is trispinose and the pterygostomian angle is also armed with a small, acute tooth or spine: this species therefore approaches to *Alph. Haugi* Cout., a remarkable form at once distinguished by the first pair of legs, the fingers of which are considerably shorter than the palm. *Alph. Sibogae*, the third, is a more different species. The front is trispinose like in *Alph. Haugi* and the antennal region also agrees with this species, but the carpocerite is slender, as long as the antennular peduncle. The chelipeds, however, are equal, project straight forward and the chelae are entirely inverted, with the dactylus placed quite inferiorly: like in the genus *Amphibetaeus* the dactylus bears a prominence, that fits into a deep groove of the immobile finger. The last species, finally, *Alph. Euryone*, is referred with some doubt to the genus *Alpheopsis*, not only because the first pair of legs are missing, but also on account of the remarkable form of the telson, which resembles that of the genus *Parabetaeus*. Unfortunately all the four species are only represented by one specimen, excepting *Alph. Chalciope*, of which two egg-bearing females were captured.

The geographical distribution is the following. *Alph. aequalis* is rather widely distributed and has been observed at Djibouti, near Perim, in the Maldive Archipelago and at New Caledonia; the variety *truncatus* Cout. was found at Goifufahendu Atoll (Maldive Archipelago). *Alph. fissipes* Cout. and *Alph. idiocarpus* Cout. are only known from Providence Island near Madagascar. The four species collected by the "Siboga" are the only representatives of this genus known to occur in the East Indian Archipelago: *Alph. consobrinus* was captured near the N. E. point of Timor, *Alph. Chalciope* near the island of Waigeu, *Alph. Sibogae* in Sapeh-Strait between the islands of Sumbawa and Flores, and *Alph.? Euryone*, finally, near the Karkaralong Islands. *Alph. trispinosus* (Stimps.) occurs at Port Jackson, but should also be found on the west coast of Africa according to COUTIÈRE (in: Bull. Mus. Paris, 1906, p. 377). *Alph. chilensis* Cout. occurs on the coast of Chili and *Alph. Haugi* Cout., finally, is a fresh-water species, living in a small lake near the banks of the river Ogoué (French Congo), at 200 kilom. from the Sea!

Alph. consobrinus was collected at a depth of 27—54 m., *Alph. Chalciope* between 59 m. and 83 m., *Alph. Sibogae* in water of 70 m. and *Alph.? Euryone* on the reef at a depth of 23—31 m. They are all inhabitants of shallow water, which is also the case with the other known species.

Key to the indopacific species of the genus *Alpheopsis* Cout.

a_1 Carpus of second legs triarticulate. No extra-corneal spines. Pterygostomian angle terminating in an acute triangular point. Legs of first pair unknown . . . . . *idiocarpus* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 4).

a_2 Carpus of second legs five-articulate.

b_1 Dactyli of three posterior legs biunguiculate. No extra-corneal spines. Legs of the first pair unknown . . . . . *fissipes* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 3).

b_2 Dactyli of three posterior legs simple.

c_1 Posterior margin of the telson straight or a little convex.

d_1 Chelae of first pair entire and smooth.

e_1 Front without extra-corneal spines.

f_1 Pterygostomian angle of the carapace rounded.

g_1 Rostrum acute . . . . . *aequalis* Cout.

(H. COUTIÈRE, in: Bull. Mus. Paris, 1896, N° 8, p. 380).

g_2 Rostrum truncate . . . . . *aequalis* Cout., var. *truncatus* Cout.

(H. COUTIÈRE, Alph. Mald. and Lacc. Archip. 1905, p. 868, Fig. 139).

f_2 Pterygostomian angle terminating in a small acute tooth. Rostrum acute. Antennular peduncle with the second article a little wider than long. Chelipeds unequal, palm of the large chela one-fourth longer than the fingers . . . . *consobrinus* de Man

e_2 Front trispinose. Pterygostomian angle with a small, acute tooth or spine. Chelae of the first pair in the female with the palm slightly shorter than the fingers. Three posterior legs slender, merus of third pair 8-times as long as wide . *Chalciope* de Man

d_2 Chelae of first pair more or less grooved, with the dactylus lunulate. Front trispinose.

e_1 Chelae of first pair entirely inverted, equal, dactylus quite inferior. No transverse groove behind the articulation of the dactylus; cutting-edge of the dactylus with a slight prominence, fitting, as in the genus *Amphibetaeus*, into a deep groove of the immobile finger . . . . . *Sibogae* de Man

e_2 Chelae of first pair unequal, dactylus at most in a horizontal plane. A deep transverse groove behind the articulation of the dactylus, the dactylus with one tooth, the immobile finger with two . . . . . *trispinosus* Stimps.

(W. STIMPSON, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 32).

c_2 Telson terminating, like in the genus *Parabetaeus*, in a large, acute tooth, that measures one-ninth the whole length of the telson. No extra-corneal teeth. Rostrum acute. Legs of the first pair unknown. *Euryone* de Man

† 1. *Alpheopsis consobrinus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 305.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 specimen.

A new species closely related to *Alph. aequalis* Cout. Rostrum triangular, probably acuminate, for in the only specimen which was collected, the extreme tip seems to be broken off; the rostrum, as long as wide at its base, just extends beyond the first antennular article and is slightly directed downward. It is obtusely carinate above and appears in a lateral view almost 3-times as long as high at its base. At either side of the rather broad and large rostrum the frontal margin, which shows no trace at all of extra-corneal teeth, soon curves downward and slightly backward; the pterygostomian angle is not rounded, but ends in a small, acute tooth or spine, like in *Alph. Chalciope*. Viewed at from above, the large black corneae, though reaching as far as the frontal margin, prove to be entirely covered by the carapace, but in a lateral aspect the lower part of the corneae slightly projects beyond the antero-lateral margin. Upper margin of the carapace straight, rounded.

The straight lower margin of the fourth and the fifth abdominal pleura terminate posteriorly in a minute, acute tooth; those of the sixth somite are articulate, movable. Telson 5-times as long as the posterior margin is broad; width near the base twice as large as that of the posterior margin. Posterior margin almost straight, hardly a little prominent in the middle, with the outer angles acute, but not prominent; longer internal spinules as long as the posterior margin is wide, outer spinules one-third of the inner. Spinules of the upper surface almost half as long as the posterior margin is broad; the anterior pair immediately behind the middle of the telson, the posterior a little farther distant from the anterior pair as from the posterior margin.

Antennular peduncle as in *Alph. aequalis* Cout., var. *truncatus* Cout. (H. COUTIÈRE, Alph. Mald. and Lacc. Archip. 1905, p. 869, Fig. 139*b*). Second article a little thicker or wider than long, the proportion being as 17 : 15, and a little shorter than the visible part of basal article; third article one and a half as long as the second. Outer flagellum consisting of two articles before bifurcation, the first of which is slightly longer than the second. Stylocerite acuminate, almost reaching to the middle of third article.

Carpocerite about as long as the scale of the scaphocerite, not longer; the scale reaches to the middle of third antennular article and is rather broad, while its outer margin is straight and terminates in a spine, which, projecting straight forward, is half as broad at its base as long and extends by one-fourth of its length beyond the scale.

External maxillipeds as in *Alph. Chalciope*.

The chelipeds resemble those of *Alph. aequalis*, the left is much larger than the right. The short ischium, a little longer than thick, of the large cheliped bears a movable spine at the apex of its upper border, which spine is but a little shorter than the joint. The merus is rather short, its outer face is 2,8-times as long as broad at the truncate distal margin, where it shows its greatest width, though it is almost as wide in the middle. The three margins are unarmed at the apex, but on the outer face an obtuse crest or ridge runs from the

proximal extremity of the upper margin to the apex of the infero-external border. Carpus short, conical, cyathiform, with a transverse groove on the upper side near the anterior margin. Chela turned outward, 2,7 mm. long, 2,3-times as long as the merus; the palm, which is a little longer than the fingers, the proportion being as 1 : 0,8, is nearly cylindrical; its rounded upper (inner) surface is 2,2-times as long as wide and there are nowhere grooves or ridges. Fingers straight, shutting close together, the immovable finger a little broader than the dactylus, the rounded, outer (upper) border of which is slightly arcuate; the cutting-edge of the immobile finger bears 9 or 10 very small, acute teeth, 3 or 4 of which in the middle are a little larger than the rest, and one observes also a few teeth on the other finger.

Merus of small cheliped 3,1-times as long as wide in the middle, appearing here slightly wider than at the truncate, distal margin; for the rest it resembles the merus of the other leg and there is also a movable spine at the apex of the upper margin of the preceding joint. The length of the chela is in proportion to that of the larger as 1 : 1,9, the latter being almost twice as long; the small chela, however, is only 1,4-times as long as the merus. The palm of the small chela is as long as the fingers and its upper surface is 1,75-times as long as wide; fingers as in the other leg.

Second legs as in *Alph. aequalis*. Ischium 5-times as long as wide, merus one-fourth longer and 6,25-times as long as wide. Carpus one-third longer than the merus, the five segments are 0,45 mm., 0,18 mm., 0,2 mm., 0,2 mm. and 0,3 mm. long. The first segment, 3,75-times as long as thick at its distal extremity, is one and a half as long as the fifth; the third is as long as the fourth, two-thirds of the fifth and the second article appears only a little shorter than the third. Chela twice as long as the fifth segment, the fingers a little shorter than the palm.

Following legs as in *Alph. trispinosus*. The ischium of the third legs which is just as long as that of the second legs and also 5-times as long as wide in the middle, bears a movable spine in the middle and another, slightly longer, near the base. Both the merus and the propodus are about twice as long as the carpus, the propodus being only 1,06-times as long as the merus; the merus is 6-times, the propodus 10-times as long as broad and the latter bears 4 short spinules besides a longer spine, twice as long, at the distal extremity. The dactylus, that measures two-fifths of the propodus, is a little curved, simple and slender, being 7-times as long as broad at its base.

The propodus of the fifth pair is just as long as that of the third, 11-times as long as broad, and bears 5 or 6 spinules besides the longer one at the distal extremity, but seems to be devoid of the transverse rows of setae; the dactylus measures one-third of the propodus.

Length 10 mm.

† 2 *Alpheopsis Chalciope* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 306.

Stat. 154. August 14. 0°7'.2 N., 130°25'.5 E. Off the North coast of Waigeu Island. 83 m., decreased till 59 m. during the haul. Grey muddy sand, shells and Lithothamnion. 2 females with eggs.

Rostrum slender, acuminate, almost reaching to the end of basal antennular article, with the lateral margins regularly curving toward the extra-corneal teeth; the rostrum appears 6-times as long as wide in the middle. Extra-corneal teeth also acute, slightly directed inward, but much shorter than the rostrum, their length being in proportion to that of the rostrum as 5 : 18. In a lateral view the upper margin of the rostrum seems to be directed obliquely downward, the lower nearly horizontal and the height of the rostrum at its base appears then to be one-third of the length; the extra-corneal teeth are also slightly turned downward. The very black and clearly facetted corneae are entirely covered by the carapace, as in *Alph. aequalis* Cout., but in a lateral view they prove to reach until to the antero-lateral margin of the carapace. Like in the genus *Cheirothrix* Sp. Bate the pterygostomian angle is armed with a small, acute tooth or spine, that is directed forward and slightly upward; this spine is barely half as long as the extra-corneal teeth. As far as I am aware, only in two other species of this genus, viz. in *Alph. idiocarpus* Cout. from Providence Island and in *Alph. consobrinus* de Man, the pterygostomian angle is marked by an acute triangular point.

Pleura of sixth abdominal somite articulate, movable. Telson elongate, 4,7-times as long as the posterior margin is wide, the latter half as wide as the width near the base; posterior margin as in *Alph. trispinosus* (vide: H. Coutière, Les Alpheidae, 1899, p. 314, Fig. 396), slightly prominent and rounded, with the outer angles not prominent at all; the longer inner spinules measure about three-fourths the width of the posterior margin, the outer are nearly half as long. The spinules of the upper surface are almost half as long as the posterior margin is wide; those of the anterior pair, that are nearly as far distant from the lateral margins as from the median line of the telson, are implanted just before the middle, the proportion between the length of the telson and the distance between this pair and the posterior margin being 1,8; the posterior pair is just as far distant from the anterior pair as from the posterior margin.

Second joint of antennular peduncle one and a half as long as thick, equal to or slightly shorter than the visible part of basal article; third article nearly as long as the second. Outer flagellum consisting of two articles before bifurcation, the first of which is almost twice as long as the second and twice as long as thick, while the second is hardly longer than thick. Olfactory setae well-developed. Inner flagellum composed of a little more than 40 articles. In *Alph. trispinosus* (Stimps.) on the contrary the second article of the outer flagellum is much longer than the first (H. Coutière, l. c. p. 133, Fig. 120). Stylocerite slender, acuminate, reaching to the distal fourth part of median antennular article. Infero-internal crest of basal antennular article terminating in an acute spine that extends as far forward as the rostrum.

Basicerite with an acute spine at the infero-external angle. Carpocerite 4-times as long as thick, about as long, not longer than the antennular peduncle; scale of scaphocerite a little longer than median antennular article, its outer margin straight and terminating in a slender, acute spine, which is twice as long as wide at its base and which, projecting beyond the scale and directed straight forward, extends to the tip of the carpocerite.

Basal article of external maxillipeds 5,6-times as long as wide, showing the same width along its whole length; the following joint measures one-fifth of the preceding and appears twice as long as thick distally; the distal joint, finally, is 3-times as long as the carpus, the

spines at the distal extremity included, and 7-times as long as broad at its base; it bears the usual, transverse rows of setae and 3 or 4 spines at the distal extremity.

One of the two females has lost both chelipeds, the other supports still the right, and another cheliped is lying loose in the tube: these two chelipeds are equal. This fact, of course, does not exclude that the chelipeds may be subequal in the female, because the detached leg perhaps belongs to the other specimen. The two chelipeds are rather feeble and somewhat resemble those of *Alph. aequalis* Cout. Of the detached cheliped the ischium is rather slender, 5-times as long as thick distally. The merus which is one and two-thirds times as long as the preceding joint, is also slender and also about 5-times as long as thick at the distal extremity, while the slightly curved joint gradually thickens toward the far end; the distal angles are obtuse, not acute as in *Alph. aequalis*. The carpus is short, one and a half as long as thick and measures one-third the length of the merus; as in *Alph. aequalis* one observes a feeble transverse groove near the articulation of the chela. Chela 4-times as long as the carpus and two-fifths longer than the merus. The palm which is very slightly shorter than the fingers, appears a little more than twice as long as high, is somewhat compressed and shows no grooves at all, the two margins running parallel with one another; the cutting-edges of the two fingers that shut close together, bear a very small tooth near the tips, while one observes moreover on the cutting-edge of the immobile finger 3 or 4 similar, minute teeth along the middle, on that of the dactylus 1 or 2. This leg is almost 4 mm. long, two-fifths the length of the body.

Second legs slender. The very slender ischium is 14-times as long as thick, the merus which is one-seventh shorter, 12-times. Carpus 1,45-times as long as the merus; the five segments are respectively 0,62 mm., 0,3 mm., 0,26 mm., 0,26 mm. and 0,3 mm. long. The first segment which is 7-times as long as thick distally, appears twice as long as the second and as the fifth that are equal, while the third and the fourth are also equal and a little shorter only than the second and the fifth; the second segment is 3-times, the fifth 2,22-times as long as thick. The chela, the fingers of which are a little longer than the palm, is just half as long as the merus and as long as the first segment of the carpus.

The third legs resemble those of *Alph. trispinosus* (Stimps.) (H. Coutière, Les Alpheidae, 1899, p. 259, Fig. 315). The slender ischium is armed with a movable spine in the middle and with another behind it. The measurements of the three following joints are: merus 1,9; carpus 1; propodus 1,8. Merus 8-times, propodus 11-times as long as wide, the propodus with 6 feeble spinules along its whole length and 2 or 3 longer spinules at the distal extremity. Dactylus simple, measuring only a little more than one-third of the propodus, slender, 7-times as long as broad at its base, slightly curved. The fifth legs are missing.

Ova few in number, 0,6 mm. long.

Length 10 mm.

† 3. *Alpheopsis Sibogae* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 307.

Stat. 49ª. April 14. 8° 23'.5 S., 119° 4'.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 specimen.

This remarkable species is at once distinguished by the characteristic shape and position

of the chelipeds. Rostrum triangular, projecting straight and horizontally forward, acute, short hardly reaching beyond the proximal third of the visible part of basal antennular article and almost 4-times as long as broad in the middle. Frontal margin broad, its outer angles slightly projecting forward and terminating in the extra-corneal teeth that reach to the middle of the rostrum; the distance between the acute tips of the rather small, extra-corneal teeth, which are a little directed inward, is 2,5-times as long as the length of the rostrum. In a lateral aspect the rostrum appears about half as high at its base as long. Anteriorly the orbits are quite open, the large, black and distinctly facetted corneae are entirely covered by the carapace, but in a lateral view a small lower part of the corneae extends beyond the lateral margin of the carapace. Pterygostomian angle rounded. Posterior angle of the third and the fourth abdominal pleura rounded, that of the fifth subacute; pleura of the sixth somite small, acute, articulate and movable. Telson much tapering backward, width of the posterior margin one-fifth the length of the telson, proportion between the width at the base and that of the posterior margin 2,2; posterior margin rather much prominent in the middle, outer angles acute, not prominent. The longer, internal spinules are nearly as long as the posterior margin is wide, the outer are hardly half as long, but still project beyond the rounded, median part of the margin. The spinules of the upper surface are just half as long as the longer inner spinules of the posterior margin; the anterior pair is situated immediately before the middle of the telson, the posterior pair a little farther distant from the anterior pair as from the posterior margin.

Antennular peduncle slender, second joint twice as long as thick and as long as the visible part of the first, third joint two-thirds the second. Undivided part of outer flagellum composed of four articles, the first as long as thick, the second somewhat shorter, two-thirds of the first, one and a half as thick as long, third a little longer than the second, fourth as long as the first; olfactory setae well-developed. Stylocerite acuminate, extending until to the 2nd fourth part of median antennular article.

Basicerite unarmed, carpocerite slender, 6-times as long as thick and as long as the antennular peduncle, flagellum slender. Scale narrow, just reaching beyond the second antennular article, its outer margin straight, terminal spine small, twice as long as broad at its base, and reaching to the 2nd third part of the third antennular article.

The chelipeds, equal to one another as regards their size and their shape, are directed straight forward, projecting by the whole length of their chelae beyond the rostrum; they are about half as long as the body.

The small and feeble merus is 1,75 mm. long, rather slender, 4-times as long as its outer surface is wide at the truncate, distal margin, and gradually thickens from the proximal to the distal extremity; the lower face is slightly concave and both the upper and the lower margin are unarmed and obtuse at apex. The carpus is short, cyathiform, anteriorly widely emarginate at each side; the anterior margin of the upper surface is slightly concave and terminates at its outer angle in an acuminate spine, that is a little directed outward, while the inner angle is obtuse; there is also an acute tooth at the inner angle of the lower surface. Like in *Betaeus Harfordi* Kingsley, the chelae are altogether inverted, the dactylus being placed at the

lower side and the plane of the fingers being perpendicular to the horizontal plane and parallel with the sagittal plane of the body; the inner face of the palm is therefore situated at the outer side, the outer at the inner side. The chelae are 5,9 mm. long, the fingers much shorter than the palm: the proportion, indeed, between the length of the palm and that of the fingers is as 1 : 0,55, the fingers being but a little more than half as long as the palm. The palm is nearly cylindrical, 3,45-times as long as high in the middle, showing here the greatest height of 1,1 mm., while the height slightly decreases toward the articulation of the fingers. The lower (upper) border of the palm bears a rather broad, though quite shallow groove that runs from the carpal articulation to the middle; a transverse groove, however, just behind the articulation of the dactylus, which is observed in *Alph. trispinosus* and in *Alph. chilensis*, is wanting completely. The inner (outer) face of the palm appears also slightly concave, almost along its whole length, the concavity extends from the lower (upper) border until near the upper (lower), but it gradually disappears distally; the outer (inner) surface of the palm is convex, like the upper (lower) border, and rounded, but one observes on that surface a small excavation at the base of the immobile finger. The fingers are strongly compressed and shut close together, while the brown horny tips cross one another. The lower (upper) margin of the dactylus is distinctly curved and the dactylus shows it greatest breadth a little beyond the middle, where the cutting-edge somewhat projects, though this prominence is rounded, and, like in the genus *Amphibetaeus* Cout., this prominence fits into a deep groove, nearly twice as long as broad, of the immobile finger. The dactylus appears here just one and a half as high as at its base; between the base and the prominence one observes 4 small, conical teeth, of which the first or most proximal is smaller than the three following. Between the oblong groove and the articulation the immobile finger bears 6 similar, small, conical teeth, the first smaller than the following, the sixth obtuse and rounded; between the groove and the tip, finally, the cutting-edge is rather sharp. The height or width of the immobile finger is nearly the same along its whole length.

Ischium of second legs 7,3-times, the merus which is one-fifth longer, 8,3-times as long as wide. The five segments of the carpus which is 1,45-times as long as the merus, are 1,56 mm., 0,26 mm., 0,23 mm., 0,26 mm. and 0,44 mm. long; the first segment, as slender as the merus, being 8,6-times as long as thick at its distal extremity, is 1,3-times as long as the sum of the four following; the second and the fourth segment that are a little longer than the third, measure just one-sixth the length of the first and the fifth is about one and a half as long as the fourth. The second segment is one and a half as long as thick. The chela is twice as long as the fifth segment, the fingers are one-fourth longer than the palm, which is one and a half as long as wide.

Following legs very slender. Ischium of third legs 6-times as long as broad, with a spine at the proximal and another near the distal extremity. Measurements of the three following joints: merus 1,56; carpus 1; propodus 1,34. Merus 10,6-times as long as wide, carpus 8,8-times as long as thick at its distal extremity, propodus 14-times as long as wide, with 4 short spinules along the posterior margin and 2 longer spinules at the distal extremity. Dactylus a little more than one-third of the propodus, almost straight, slender, 8-times as long as thick

at the articulation; the dactylus is simple, without an accessory tooth on the ventral or posterior margin, but there are two minute teeth on the distal half of the anterior, with one or two short setae implanted near each of these teeth.

Measurements of the fifth legs: merus 1,33; carpus 1; propodus 1,6. Merus 13-times, propodus 21-times as long as wide; carpus also very slender, 10,6-times as long as thick at distal extremity. The propodus bears 9 very small spinules along the posterior margin and 2 longer ones at the distal end; dactylus 10-times as long as thick near the articulation, measuring almost one-third the length of the propodus.

Length 16 mm.

† 4. *Alpheopsis*? *Euryone* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 308.

Stat. 129. July 22/23. Anchorage off Kawio- and Kamboling-islands, Karkaralong-group. Reef. 1 ova-bearing female.

It is with some doubt that this species is referred to the genus *Alpheopsis* Cout., because the legs of the first pair are missing and because the telson shows a quite different form from that of the known species of this genus, resembling the telson of the genus *Parabetaeus* (H. Coutière, Les Alpheidae. 1899, p. 310, Fig. 390).

Frontal region as in *Alpheopsis aequalis* Cout., but the triangular, acute rostrum which is slightly convex above and which does not yet reach to the middle of the visible part of first antennular article, appears distinctly wider than long; as in *Alph. aequalis* the rostrum rejoins at either side the frontal margin by a regular curve, and, like in this species, there is no trace of extra-corneal teeth, though the frontal margin makes an obtuse angle with the descending, lateral parts of the anterior margin of the carapace. Pterygostomian angle rounded. Upper surface of the carapace finely punctate. Ophthalmopods widely accessible from before. Pleura of sixth abdominal somite triangular, movable, articulate. The telson, which is one and a half as long as the sixth somite, is elongate, 2,91 mm. long and, the posterior margin being 0,53 mm. wide, it appears to be 5,5-times as long as this margin is wide; proportion between the width at the base and that of the posterior margin 2,2. Like in the genus *Parabetaeus*, the telson considerably narrows backward and ends in an acute median tooth, that measures one-ninth the total length of the telson and that is a little longer than wide at its base, the proportion being as 16 : 13; this tooth is almost twice as broad at its base as the lateral parts of the posterior margin. These lateral parts make obtuse angles with the lateral borders of the tooth and carry two spinules, the inner longer spinule one and a half as long as the median tooth, the outer measuring one-third the length of the inner; the outer angles of the posterior margin are hardly marked. The lateral margins of the median tooth are fringed with 4 or 5 setae that are even a little longer than the internal spinules of the posterior margin. Spinules of the upper surface small, measuring $^1/_{15}$ the length of the telson and situated not far from the lateral margins; the anterior pair a little before the middle, the proportion between the length of the telson and the distance of the anterior pair from the end of the

telson being as 1 : 0,57; posterior pair but a trifle farther distant from the extremity of the telson as from the anterior pair.

Antennular peduncle stout, resembling that of *Alph. aequalis* Cout. var. *truncatus* Cout. (Alpheidae Mald. and Lacc. Archip. 1905, p. 869, Fig. 139); the second article which is a little wider than long, appears a little longer than the visible part of the first and than the third article; stylocerite acute, similar to that of the variety *truncatus*, but reaching only to the middle of second antennular article or hardly beyond it. Basicerite with a rather large, acute, triangular tooth or lobe at the lower side; carpocerite stout, a little more than twice as long as thick and reaching about to the middle of third antennular article; antennal flagellum nearly twice as long as the carapace. Scaphocerite as long as the antennular peduncle, very broad like in *Athanopsis*, with the terminal spine very small, curved inward and not reaching beyond the rounded, anterior margin of the scale.

Merus of second legs 7-times as long as wide. Carpus 1,3-times as long as the merus; first segment 1,3 mm. long and 6,5-times as long as thick at distal extremity, second 0,24 mm. long, third 0,2 mm., fourth 0,24 mm., fifth 0,42 mm., the first segment being a little longer than the sum of the following, the proportion being as 1 : 0,85. Chela 0,81 mm. long, about twice as long as the fifth segment; fingers one-third longer than the palm.

Relative dimensions of third legs: merus 1,4; carpus 1; propodus 1,16. Merus 6-times longer than wide, armed, as in the genus *Parabetaeus*, with 1 or 2 small spinules on the proximal half of the posterior margin, ischium also with a movable spine near the base; carpus slender, 7-times as long as thick at distal extremity; propodus 9-times as long as broad, with 5 spinules on the posterior margin, of which the spinule at the distal extremity is the longest of all, 0,34 mm. long, almost half as long as the dactylus; there are also 3 or 4 spinules at the distal extremity of the anterior margin, preceded by 2 or 3 smaller ones. Dactylus measuring two-fifths of the propodus and one-third of the merus, slender, 6,6-times as long as thick at the base, slightly curved, simple, with 2 or 3 setae at the distal third of the anterior margin. These legs are slightly setose, especially the propodus.

Eggs ovoid, 0,65 mm. long, one and a half as long as thick.

Length 18,5 mm.

Synalpheus Sp. Bate.

The Russian naturalist PAULSON has been the first who recognized in 1875 the generic value of the genera *Alpheus* and *Synalpheus* when he observed the fact that in the latter genus the epipods of the thoracic legs are wanting. Erroneously, however, PAULSON created the new genus *Alpheoides* for those species which are furnished with epipods, while he left the name of *Alpheus* to those that are destitute of these appendages. Ignorant of PAULSON's paper I also recognized, thirteen years later, the close relationship of the species which are at present included in the genus *Synalpheus*: for the first time, indeed, the old genus *Alpheus* Fabr. was divided by me into four natural groups, one of which, the *Spinifrons* group, corresponds to the present genus *Synalpheus* (J. G. de Man, in: Archiv f. Naturg. 53. Jahrg. 1888, p. 498). In the same

year 1888 the genus *Synalpheus* was created by SPENCE BATE, in the Report on the Macrura collected by the Challenger Expedition, for a species which he thought to be new, but which six years before had already been described by HASWELL under the name of *A. Comatularum*: in spite of the creation of this genus, several other species which also belong to this quite natural group, were erroneously referred by SPENCE BATE to the old genus *Alpheus*. In his important and masterly treatise on the Alpheidae published in 1899, Professor COUTIÈRE has finally definitively established the characters by which the genus *Synalpheus* is differentiated from the other genera of the family Alpheidae.

Of the genus *Synalpheus* no less than 38 species and 9 varieties have been collected by the Expedition of the "Siboga", of which 22 respectively 7 proved to be new to science! The total number of species of *Synalpheus* recorded from the Indopacific region therefore now amounts to 62 species and 15 varieties. Of the 16 old species and the 2 old varieties, that were collected by the "Siboga", two, viz. *Syn. Charon* (Heller) and *Syn. Nilandensis* Cout., are apparently distributed through the whole Indopacific: the first, indeed, which was discovered in the Red Sea, has also been taken near the Hawaiian Islands, the other, at first recorded from the Maldive and Laccadive Archipelagoes, occurs also at the Mangarewa Islands, in the Pacific. *Syn. amboinae* (Zehntner) and *Syn. carinatus* (de Man) were still only known from Amboina, as was likewise the case with *Syn. demani* Borr., but the latter has also been observed at the Loyalty Islands; *Syn. Pococki* has also a limited distribution, for this species was only known from the eastern parts of the Archipelago as far as the Holothuria Bank, N.W. Australia and Torres Straits. Eight species and two varieties are also found westward from the East Indian Archipelago, but are not yet observed eastward from it. These species are the following:

Syn. Gravieri Cout.
Syn. heroni Cout.
Syn. neomeris (de Man)
Syn. streptodactylus Cout.
Syn. acanthitelsonis Cout.
Syn. hastilicrassus Cout.
Syn. tumidomanus Cout.
Syn. biunguiculatus (Stimps.) Cout.
Syn. Nilandensis Cout. var. *oxyceros* Cout.
Syn. paraneomeris Cout. var. *prolatus* Cout.

According to COUTIÈRE, *Syn. Gravieri* should also exist in the China Sea, but the occurrence of *Syn. neomeris* in Japan and in the Pacific is, in my opinion, still doubtful. One species, *Syn. neptunus* (Dana), occurs also in the Pacific and *Syn. Pescadorensis* Cout., that inhabits the Pescadore Islands near Formosa, has also been captured in the Maldive and Laccadive Archipelagoes. The two varieties, finally, *Syn. Nilandensis* Cout. var. *oxyceros* Cout. and *Syn. paraneomeris* Cout. var. *prolatus*, are distributed in the northwestern part of the Indian Ocean.

With regard to the range of the 24 old species and the 6 old varieties which were not collected by the "Siboga", the following may be remarked. *Syn. Comatularum* (Hasw.) inhabits the Albany Passage near Cape York and Thursday Island, like also *Syn. Haddoni* Cout., a remarkable species of which it is still doubtful whether it belongs to the *Biunguiculatus* or to the *Laevimanus* group. *Syn. Stimpsoni* (de Man) is only known from Amboina, and *Syn. Helleri* de Man only from the Nicobar Islands, while *Syn. Bakeri* Cout. var. *Stormi* n. has still only

been observed at Atjeh; *Syn. hululensis* Cout., finally, has been recorded from the Red Sea, the Indian Ocean and the Pacific as far as the american coast and will therefore certainly once prove to occur also in the East Indian Archipelago. We may consequently also include these five species and this variety in the Fauna of the Indian Archipelago and we come then to the conclusion that two thirds of all the Indopacific species and two thirds of all the Indopacific varieties, that are known at present, are inhabitants of the East Indian Archipelago.

Fourteen species and five varieties are at present only known from the Indian Ocean and, generally speaking, from the seas situated westward from the Archipelago. They are the following:

Syn. fossor (Paulson)
Syn. merospiniger Cout.
Syn. otiosus Cout.
Syn. paraneomeris Cout.
Syn. physocheles Cout.
Syn. trionyx Cout.
Syn. triunguiculatus (Paulson)
Syn. Mushaensis Cout.
Syn. Paulsoni Nob.
Syn. tricuspidatus (Heller)
Syn. laticeps Cout.
Syn. lophodactylus Cout.
Syn. pachymeris Cout.
Syn. Sladeni Cout.
Syn. Stimpsonii de Man var. *Maldivensis* Cout.
Syn. Paulsoni Nob. var. *Kurracheensis* Cout.
Syn. Paulsoni Nob. var. *liminaris* Cout.
Syn. Paulsoni Nob. var. *Rameswarensis* Cout.
Syn. biunguiculatus (Stimps.) Cout. var. *exilipes* Cout.

These 14 species and 5 varieties that hitherto have only been observed in the Red Sea and the northwestern parts of the Indian Ocean, are probably confined to these seas though the possibility of their existing also in the Indian Archipelago is, of course, not excluded.

Syn. Albatrossi Cout. is a species only known from Laysan Island in the northern Pacific and *Syn. brachyceros* Nob. only from Makatea, while *Syn. Bakeri* Cout. and *Syn. Mac-Cullochi* Cout. are up to the present time only met with on the coast of South Adelaide, the latter, however, also at Port Jackson. *Syn. Latastei* Cout., finally, inhabits the coast of Chile, but exists perhaps also in the seas of Australia.

There can be little doubt, however, that new researches, especially in the Pacific and in the seas of Japan and China, will make us acquainted with other species of which we are at present still ignorant.

When looking over the new species and varieties discovered by the "Siboga", we call in the first place attention to *Syn. odontophorus*, a form of the *Comatularum* group, noteworthy by the prominent tooth with which the immobile finger of the large chela is armed. The 7 species and 3 varieties of which the *Comatularum* group is at present composed, are all inhabitants of the East Indian Archipelago, except only *Syn. Albatrossi* and *Syn. Stimpsonii* var. *Maldivensis*. Among those species of the *Neomeris* group, in which the dactyli of the three posterior legs are biunguiculate, *Syn. Pococki* is remarkable just by the form of these dactyli, because the ventral hook is very short, measuring only one-eighth the total length of the dactyli: in the new *Syn. Iocasta*, which is represented by numerous specimens, the dactyli have nearly the same form,

but the ventral hook is still considerably shorter. The other new species and varieties of this group closely approach to some known forms, the differences are in general not striking.

Syn. Theophane of the *Paulsoni* group much approaches to *Syn. tumidomanus* (Paulson), but the spinules on the upper surface of the telson are arranged in a rectangle that is wider than long. A more interesting form is the new *Syn. ancistrorhynchus* from the Jedan Islands, which is related to *Syn. acanthitelsonis* by the shape of the telson, but the merus of the third legs bears three feeble movable spinules and the frontal spines are curved upward like barbed hooks. The characters of the two other new species, *Syn. gracilirostris* and *Syn. hilarulus*, are less conspicuous.

The acquisitions made in the *Biunguiculatus* group are more interesting. As far as I am aware, in all the Indopacific species of this genus the posterior margin of the 6th abdominal somite is entire. Now the expedition of the "Siboga" has discovered no less than 6 different species, all pertaining to the *Biunguiculatus* group, in which species the posterior margin of that somite is armed with 2, 3, 4 or 7 spines or acute teeth; these species, however, not only differ from one another by the number of teeth with which the 6th abdominal somite is armed, but also by many other features. Another remarkable form is the new *Syn. bituberculatus*, represented by several specimens: different from all other species, except *Syn. septemspinosus*, the large chela ends anteriorly in two conical tubercles, instead of one as usually. As a quite interesting form ought also to be considered *Syn. Antenor*, not only on account of the extraordinary slender form of the antennular and antennal peduncles, of the telson etc. but also on account of the fact that this species belongs to the largest representatives of the genus. This species, however, is not new, for it has already been described by me in 1888 under the name of *A. biunguiculatus* Stimps.

Except, perhaps, *Syn. carinatus* (de Man) var. *binongcensis*, *Syn. odontophorus* and *Syn. streptodactylus*, all the Indopacific species of this genus, as far as we are aware, are inhabitants of shallow water: of 13 species and 4 varieties, indeed, the depth at which they have been obtained, is still unknown. Twenty six species and 6 varieties have been taken not deeper than 54 m. or 30 fathoms, but four of them, *Syn. Nilandensis* var. *oxyceros*, *Syn. acanthitelsonis*, *Syn. biunguiculatus* and *Syn. Pescadorensis*, like also *Syn. fossor*, *paraneomeris*, *hululensis*, *laticeps*, *pachymeris* and *biunguiculatus* var. *exilipes* extend perhaps to a depth of 90 m. (H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 852). The following species have also been taken in deeper water, not deeper, however, than 113 m.:

Syn. consobrinus de Man
Syn. odontophorus de Man
Syn. neomeris (de Man)
Syn. Gravieri Cout.
Syn. Iphinoë de Man
Syn. streptodactylus Cout.
Syn. Iocasta de Man
Syn. Nilandensis Cout.
Syn. Nilandensis Cout. var. *bandaensis* de Man
Syn. hastilicrassus Cout.
Syn. hastilicrassus Cout. var.
Syn. triacanthus de Man
Syn. quadrispinosus de Man
Syn. trispinosus de Man.
Syn. neptunus (Dana)
Syn. Antenor de Man
Syn. merospiniger Cout.

We know at present that some species of this genus are sedentary animals, living on sponges, corals etc. and that they are not free swimming. This manner of life may probably account for the fact that the great majority of the species collected are only represented by a few specimens and that of several species only one single specimen has been captured. Unfortunately, except for a few species, no information is to be given with regard to the manner of life, so that I am unable to enlarge our knowledge about the biology of the numerous species existing in the Archipelago. The new variety *binongcensis* of *Syn. carinatus* (de Man) was collected on a *Comatula* and the new *Syn. triacanthus*, a single male of which has been captured at a depth of 112 m., was found living in a specimen of *Solenocaulon* Gray.

Several species, especially among the new ones, are perhaps rare forms of a quite local distribution, but, in conclusion, the rarity of specimens of other species may be accidental.

The genus *Synalpheus* Sp. Bate has been divided by COUTIÈRE into six groups that are quite natural and that therefore are also accepted by me. The key to these groups was published in his paper, entitled: "The American Species of snapping shrimps of the genus *Synalpheus*, Washington, 1909, p. 3".

Excepting the *Brevicarpus* group, all are inhabiting the Indopacific region.

List of all the Indopacific species of the genus *Synalpheus*, arranged according to their relationship, as indicated in the keys[1]).

I. *Comatularum* group.

Comatularum (Hasw.) 1882 = falcatus Sp. Bate 1888.
*amboinae (Zehntner) 1894.
Stimpsonii (de Man) 1888.
Stimpsonii (de Man) var. Maldivensis Cout. 1905.
***consobrinus** de Man 1909.
***odontophorus** de Man 1909.
*carinatus (de Man) 1888.
*carinatus (de Man) var. **binongcensis** de Man 1909.
*carinatus (de Man) var. **ubianensis** de Man 1909.
Albatrossi Cout. 1909.

II. *Neomeris* group.

*neomeris (de Man) 1897.
*Gravieri Cout. 1905.
***Iphinoë** de Man 1909.
***jedanensis** de Man 1909.
***miscellaneus** de Man 1909.
*streptodactylus Cout. 1905.
***streptodactyloides** de Man 1909.
***modestus** de Man 1909.
*Pococki Cout. 1898.
***Iocasta** de Man 1909.
paraneomeris Cout. 1905.
*paraneomeris Cout. var. **praedabunda** de Man 1909.
*paraneomeris Cout. var. prolatus Cout. 1909.
*paraneomeris Cout. var. **halmaherensis** de Man 1909.
otiosus Cout. 1908.
*Charon (Heller) 1861.
Helleri de Man 1910.
*Nilandensis Cout. 1905.
*Nilandensis Cout. var. **bandaensis** de Man 1909.
*Nilandensis Cout. var. oxyceros Cout. 1905.
triunguiculatus (Paulson) 1875.
physocheles Cout. 1908.
fossor (Paulson) 1875.
*fossor (Paulson) var. **propinqua** de Man 1909.
trionyx Cout. 1908.
Bakeri Cout. 1908.
Bakeri Cout. var. **Stormi** n. 1910.
*Heroni Cout. 1909.
*demani Borr. 1899.
merospiniger Cout. 1908.

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1) The species collected by the "Siboga" are marked with an asterisk and the new species are printed in a more heavy type.

III. *Paulsoni* group.

*tumidomanus (Paulson) 1875.
*Theophane de Man 1910.
*hastilicrassus Cout. 1905.
*hastilicrassus Cout. var. de Man 1910.
*acanthitelsonis Cout. 1905.
hululensis Cout. 1909.
*ancistrorhynchus de Man 1909.
Paulsoni Nob. 1906.
Paulsoni Nob. var. Rameswarensis Cout. 1908.
Paulsoni Nob. var. Kurracheensis Cout. 1908.
Paulsoni Nob. var. liminaris Cout. 1908.
Mac-Cullochi Cout. 1908.
*gracilirostris de Man 1910.
Mushaensis Cout. 1908.
*hilarulus de Man 1910.
Latastei Cout. 1908.
tricuspidatus (Heller) 1861.

IV. *Biunguiculatus* group.

*biunguiculatus (Stimps.) Cout. 1898.
biunguiculatus (Stimps.) Cout. var. exilipes Cout. 1905.
brachyceros Nob. 1906.
*amabilis de Man 1910.
lophodactylus Cout. 1908.
pachymeris Cout. 1905.
*bituberculatus de Man 1910.
*bispinosus de Man 1910.
*triacanthus de Man 1910.
*quadridens de Man 1910.
*quadrispinosus de Man 1910.
*trispinosus de Man 1910.
*septemspinosus de Man 1910.
*neptunus (Dana) 1852.
*Theano de Man 1910.
laticeps Cout. 1905.
*Antenor de Man 1910.
*Pescadorensis Cout. 1905.

V. *Laevimanus* group.

? Haddoni Cout. 1900.
Sladeni Cout. 1908.

Key to the indopacific species and varieties of the genus *Synalpheus*.

Comatularum group.

a_1 Merus of the third and the fourth pair of legs with an acute tooth at the distal end of the lower margin.

b_1 Dactylus of the small chela not shorter than the palm, curved like a hook and longer than the immobile finger. Rostrum very long, reaching nearly the end of the antennular peduncle . . . . . *Comatularum* (Hasw.)

(W. A. HASWELL, Catal. Australian Stalk- and Sessile-eyed Crustacea, 1882, p. 189. E. J. MIERS, Report Zool. Coll. H. M. S. "Alert", 1884, p. 289. C. SPENCE BATE, Report Challenger Macrura, 1888, p. 574, Pl. CIII *(Synalpheus falcatus)*).

b_2 Fingers of the small chela much shorter than the palm, about half as long.

c_1 Telson with the anterior pair of spinules situated behind the middle, close to the lateral margins.

d_1 Front not very prominent, rostrum reaching to the middle of the 2nd or the 3rd antennular article; lower spine of basicerite as long as the supra-orbital spines; spinules of the upper surface of the telson large, 0,42 mm. long, anterior pair just behind the middle . . . . . *amboinae* (Zehntner)

d_2 Front very prominent.

e_1 Lower spine of basicerite shorter than the supraorbital spines.

f_1 Rostrum reaching the middle of 2nd antennular article, visible part of 1st article hardly longer than 2nd, ventral accessory hook of the dactylus of 3rd pair oblique with regard to the lower margin . . . . . *Stimpsonii* (de Man)

(J. G. DE MAN, in: Archiv für Naturg. 53. Jahrg. 1888, p. 513, Taf. XXII, Fig. 3).

f_2 Rostrum a little shorter than 1st antennular article, visible part of 1st article hardly longer than 2nd, ventral accessory hook of the dactylus of 3rd pair perpendicular to the lower margin. . . . . *Stimpsonii* (de Man) var. *Maldivensis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 878, Pl. LXXIII, fig. 16).

e_2 Lower spine of basicerite not shorter than the supra-orbital spines, not yet or hardly reaching to the middle of the visible part of 1st antennular article, this visible part almost twice as long as 2nd article; rostrum usually a little shorter than 1st article. Spinules of the upper surface of the telson small, 0,22 mm. long, anterior pair far behind the middle. Ventral accessory hook of the dactylus of 3rd pair perpendicular to the lower margin . . . . . *consobrinus* de Man

c_2 Telson with the anterior pair of spinules situated before the middle, rather far remote from the lateral margins. Frontal and antennal region as in *Syn. Stimpsonii* de Man, but the stylocerite reaches only to the middle of the visible part of 1st antennular article. Large chela of the female with the distal lobe on the inner side of the immobile finger not rounded as in *Syn. consobrinus*, but produced into an acute prominent tooth. (Male unknown) . . *odontophorus* de Man

a_2 Merus of the third and the fourth pair of legs unarmed.

b_1 Rostrum reaching just beyond the extremity or almost to the extremity of 2nd antennular article; rostrum carinate, the carina continued to quite near the posterior margin of the carapace.

c_1 Rostral carina with a notch at the limit between the gastric and cardiac regions.

Ova 0,9—1 mm. long. Proportion between the width of the telson at base and the posterior margin 2,2 . . . . . *carinatus* (de Man)

c_2 Rostral carina without a notch, telson at least 2,6-times as wide at base as the posterior margin is broad.

d_1 Ova 1,2 mm. long . . . . . *carinatus* (de Man) var. *binongcensis* de Man

d_2 Ova 0,4—0,5 mm. long . . . . . *carinatus* (de Man) var. *ubianensis* de Man

b_2 Rostrum not carinate, very short, a little shorter than the basal antennular article. Lower spine of basicerite not attaining the extremity of the frontal spines . . . . . *Albatrossi* Cout.

(H. COUTIÈRE, in: Proc. U. S. National Museum, XXXVI, 1909, p. 89).

Neomeris group.

a_1 Dactylus of the third legs biunguiculate.

b_1 Merus of the third legs armed with one or more spinules on the posterior margin. Upper angle of basicerite spinulose.

c_1 Dactylus of the third legs with the ventral hook half as long or almost half as long as this joint.

d_1 Small chela more than 3-times as long as high.

e_1 Ventral or principal hook of the dactyli of third legs making an oblique angle with the lower border; telson with the anterior pair of spinules usually situated behind the middle.

f_1 Telson with the anterior pair of spinules situated far backward, at or near the posterior third; stylocerite reaching to the middle or just beyond the middle of median antennular article. *neomeris* (de Man)

f_2 Telson with the anterior pair of spinules situated but a little behind the middle; stylocerite but a little longer than 1st antennular article . . . . . *Gravieri* Cout.

e_2 Ventral or principal hook of the dactyli of third legs perpendicular to the lower border. Telson with the anterior pair of spinules situated before the middle . . . . . *Iphinoë* de Man

d_2 Small chela less than 3-times as long as high, palm one and a half as long as high.

g_1 Telson with the anterior pair of spinules situated just in front of the middle. Dactyli of third legs as in *Syn. Gravieri* . *jedanensis* de Man

g_2 Telson with the anterior pair of spinules situated far backward, just at the posterior third, nearly as in *Syn. neomeris*; dactyli of third legs also as in this species . . . . . *miscellaneus* de Man

c_2 Dactylus of third legs with the ventral hook measuring about one-fourth the length of that joint.

h_1 Rostrum not reaching beyond basal antennular article, less than four times as long as wide at its base; telson more than 2,5-times as long as the posterior margin is wide.

i_1 Rostrum usually 3-times (2,75—3,25) as long as wide at its base; telson with the anterior pair of spinules situated just before the middle. Dactylus of third legs 3-times as long as thick at its base . . . . . *streptodactylus* Cout.

i_2 Rostrum 2,2-times as long as wide at its base; telson with the anterior pair of spinules situated a little behind the middle and nearer to the lateral margins than in *Syn. streptodactylus*, the spinules 0,07—0,08 mm. long, much smaller than in this species. Dactylus of third legs 2,51-times as long as thick at its base . . . . . *streptodactyloides* de Man

h_2 Rostrum reaching to just beyond the middle of median antennular article, five times as long as wide at its base. Telson 2,375-times as long as the posterior margin is wide, anterior pair of spinules 0,13 mm. long, situated before the middle. Dactylus of third legs 2,5-times as long as thick at its base. *modestus* de Man

c_3 Dactylus of third legs with the ventral hook measuring one-eighth the length of this joint or still less.

j_1 Dactylus of third legs with the ventral hook measuring one-eighth the length of this joint, the dactylus one-fourth the propodus; propodus distinctly arcuate, the concave posterior margin with only 2 or 3 short spinules, that are separated by long, smooth interspaces . . . . . *Pococki* Cout.

j_2 Dactylus of third legs with the ventral hook measuring $^1/_{14}$—$^1/_{17}$ the length of this joint, the dactylus one-third, rarely two-fifths the length of the propodus; propodus nearly straight, posterior margin with 7—10 spinules, that are separated from one another by short interspaces . . . . . *Iocasta* de Man

b_2 Merus of third legs unarmed. Upper angle of basicerite without a spine, truncate.

k_1 Dactylus of third legs with the ventral hook acute, conical. Merus at least 3,5-times as long as wide.

l_1 Proportion between the width of the telson at base and that of the posterior margin nearly 2, rarely 1,7, but in this case the carpocerite 3,54-times as long as wide.

m_1 Median antennular article slightly longer than wide distally.

n_1 Terminal spine of scaphocerite a little shorter than carpocerite.

o_1 Merus of third legs 4—4,5-times as long as wide . . *paraneomeris* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. LXXI, fig. 7').

o_2 Merus of third legs 3,56—3,58-times as long as wide. *paraneomeris* Cout. var. *praedabunda* de Man

n_2 Terminal spine of scaphocerite a little longer than carpocerite. . . . . *paraneomeris* Cout. var. *prolatus* Cout.

m_2 Median antennular article a little wider distally than long. Terminal spine of scaphocerite a little shorter than carpocerite . . . . . *paraneomeris* Cout. var. *halmaherensis* de Man

l_2 Proportion between the width of the telson at base and that of the posterior margin 1,5. Carpocerite 3-times as long as wide. . . . . *otiosus* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 5).

k_2 Dactylus of third legs with the ventral hook obtuse. Merus at the utmost 3,1-times as long as wide.

p_1 Ventral hook of the dactylus spoon-like excavate, anterior margin of the dactylus with a process with which the dorsal hook has coalesced. Frontal spines acute, rostrum with the margins straight and converging from the base to the tip . . . *Charon* (Heller)

p_2 Ventral hook of the dactylus probably not excavate, anterior margin of the dactylus probably without a process. Lateral margins of the rostrum at first parallel, further converging to the tip. Lateral teeth broader than those of *Syn. Charon* (Heller), not acuminate . . . . . *Helleri* de Man

(Syn.: *A. charon* J. G. de Man, in: Zool. Jahrb. Abth. f. Syst. IX, 1897, p. 743, Taf. 35, fig. 63).

a_2 Dactylus of third legs triunguiculate.

b_1 Merus of third legs with movable spinules on its posterior margin.

c_1 Terminal spine of scaphocerite shorter than carpocerite. Lower spine of the basicerite about as long as basal antennular article.

d_1 Dactylus of third legs stout, about 1,5-times as long as broad at its base, the principal hook perpendicular to the axis of the joint . . . . . *Nilandensis* Cout.

d_2 Dactylus of third legs 2,5-times as long as broad at its base, the principal hook directed obliquely forward . . . . *Nilandensis* Cout. var. *bandaensis* de Man

c_2 Terminal spine of scaphocerite longer than carpocerite. Lower spine of the basicerite reaching to apex of median antennular article . . . . . *Nilandensis* Cout. var. *oxyceros* Cout.

b_2 Merus of third legs unarmed.

c_1 Spinules of the upper surface of the telson quite distinct. Propodus of third legs spinulose along its posterior margin.

d_1 Dactylus of third legs with the ventral hook measuring three-fourths the principal, being almost as long as it.

e_1 Fingers of large chela of moderate length, their length in proportion to that of the chela as 1 : 3,5. Carpocerite 4,3—4,5-times as long as wide . . . . . *triunguiculatus* (Paulson)

(Confer: G. Nobili, in: Bull. Scientif. France et Belgique, XL, 1906, p. 25).

e_2 Fingers of large chela extraordinarily short, their length in proportion to that of the chela as 1 : 5,33. Carpocerite 5-times as long as wide . . . . . *physocheles* Cout.

(H. Coutière, in: Bull. Soc. Philom. Paris, 1908, p. 10).

d_2 Dactylus of third legs with the ventral hook much shorter than the principal.

e_1 Carpocerite more than 4,5-times as long as wide.

f_1 Carpocerite 6- or almost 6-times as long as wide. Palm of larger chela with an obtuse tubercle at the distal extremity. Smaller chela 2,4—2,6-times as long as high. Merus of third legs 2,8—3-times as long as wide . . . . . *fossor* (Paulson)

(Paulson, Studies on the Crustacea of the Red Sea, (in Russian), Kiew, 1875, p. 103, pl. 13, Fig. 5. — Confer also: H. Coutière, Alpheidae Mald. and Lacc. Archip. 1905, p. 872, Pl. LXX, fig. 6).

f_2 Carpocerite 4,6-times as long as wide. Palm of large chela with an obtuse tubercle at the distal extremity. Small chela 2,73—3,2-times longer than high. Merus of third legs 3,4—3,6-times as long as wide. *fossor* (Paulson) var. *propinqua* de Man

f_3 Carpocerite 5-times as long as wide. Palm of large chela spinous at the distal extremity. Small chela 3-times longer than high. Merus of third legs 4,4-times as long as wide . . . . . *trionyx* Cout.

(H. Coutière, in: Bull. Soc. Philom. Paris, 1908, p. 6).

e_2 Carpocerite about 4-, or less than 4-times as long as wide. Ventral hook of the dactylus of third legs measuring hardly one-fourth the principal one.

f_1 Carpocerite 3,6-times as long as wide. Merus of third legs more than 3-times as long as wide.

g_1 Palm of large chela unarmed at the distal extremity. Merus of third legs 3,5-times as long as wide . . *Bakeri* Cout.

(H. Coutière, in: Bull. Soc. Philom. Paris, 1908, p. 9).

g_2 Palm of large chela terminating in a small conical tooth. Merus of third legs 4-times as long as wide. *Bakeri* Cout. var. *Stormi* n.

f_2 Carpocerite about 4-times as long as wide. Palm of larger chela with an obtuse tubercle at the distal extremity. Merus of third legs 2,32—2,6-times as long as wide . *heroni* Cout.

c_2 Spinules of the upper surface of the telson wanting or quite rudimentary. Propodus of third legs without spinules on its posterior margin, excepting 2 or 3 at the distal end . . . *demani* Borr.

Paulsoni group.

a_1 Carpocerite elongate, 4- or more than 4-times as long as wide. Posterior angles of telson often spinous.

b_1 Merus of third legs unarmed. Lower spine of basicerite a little shorter than the stylocerite.

c_1 Posterior angles of the telson decidedly spinous, at least half as long as the outer spinules.

d_1 Carpocerite slender, not thickened in the middle.

e_1 Terminal spine of scaphocerite as long as the carpocerite, upper angle of basicerite spiniform. Third antennular article shorter than second. Distance between the posterior pair of spinules of the upper surface of the telson and the median part of the posterior margin hardly more than half as long as the posterior margin is wide. Eggs very large, giving rise to mysis. . . . . *tumidomanus* (Paulson)

e_2 Terminal spine of scaphocerite distinctly longer than the carpocerite, upper angle of basicerite spiniform. Third antennular article as long as second. Posterior pair of spinules just as far distant from the median part of the posterior margin of the telson as this margin is wide; spinules of the upper surface rather far distant from the lateral margins, inserted at the angles of a rectangle that is wider than long. Eggs rather numerous, 0,75—0,8 mm. long . *Theophane* de Man

d_2 Carpocerite a little thickened in the middle, ovoid.

Terminal spine of scaphocerite as long as the carpocerite. Third antennular article shorter than second.

e_1 Upper angle of basicerite truncate. Posterior angles of the telson about as long as the median part of the posterior margin. Distance between the posterior pair of spinules and the median part of the posterior margin but a little shorter than the width of the latter or just as long.

f_1 Length of the large chela in proportion to that of the fingers as 4,2 : 1 . . . . . *hastilicrassus* Cout.

f_2 Length of the large chela in proportion to that of the fingers as 2,9 : 1 . . . . . *hastilicrassus* Cout. var.

e_2 Upper angle of basicerite spiniform, sometimes only acute. Posterior angles of the telson longer than the median part of the posterior margin. Distance between the posterior pair of spinules and the median part of the posterior margin much shorter than the width of the latter, usually two-thirds or three-fourths, rarely only one-sixth. . . . . *acanthitelsonis* Cout.

c_2 Posterior angles of telson acute, though not spinous, hardly one-fourth the length of the outer spinules. Carpocerite slender, 3,8—4,1-times as long as wide, not thickened in the middle, as long as the terminal spine of the scaphocerite. Third antennular article shorter than second. Upper angle of the basicerite

spiniform, lower spine one and a half as long as the basal part. Palm of large chela unarmed at distal extremity . . . . . *hululensis* Cout.

(Synon.: *Syn. tumidomanus* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 876, Pl. LXXIII, fig. 14. — Confer also: H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 12 and in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 24).

b_2 Merus of third legs armed with 3 feeble, movable spinules on the distal third of the posterior margin. Lower spine of basicerite as long or slightly longer than the stylocerite, upper spine small. Frontal spines short, acute, with the tips curved upward like barbed hooks. Terminal spine of scaphocerite shorter than the carpocerite. Posterior margin of the telson as in *Syn. acanthitelsonis* Cout. . . . . *ancistrorhynchus* de Man

a_2 Carpocerite short, less than 4-times as long as wide. Posterior angles of the telson, though often acute, never spinous. Merus of third legs smooth.

b_1 Large chela about 2,8-times as long as high.

c_1 Terminal spine of scaphocerite longer than carpocerite.

d_1 Carpocerite 3,5-times or less than 3,5-times as long as wide; rarely more than 3,5-times, in this case the palm of the large chela terminates in a strong anterior spine.

e_1 Rostrum shorter than basal antennular article. Eggs small, producing zoëae.

f_1 Palm of large chela unarmed. Carpocerite 2,87—3,1-times longer than wide. Basicerite slightly longer than its inferior spine, upper angle with a short spine. Merus of third legs 3,6—3,8-times longer than wide . . . *Paulsoni* Nob.

(G. NOBILI, in: Bull. Scientif. France et Belgique, XL, 1906, p. 28).

f_2 Palm of large chela terminating in a straight, conical spine. Carpocerite 3,2—3,5-times as long as wide. Basicerite as in the typical species . . . . *Paulsoni* Nob. var. *Rameswarensis* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 11).

f_3 Palm of large chela ending in a spine. Carpocerite 2,75-times as long as wide. Lower spine of basicerite shorter and stouter than in f_1 and f_2. Merus of third legs 3,6-times (♂), 3,3-times (♀) longer than wide. *Paulsoni* Nob. var. *Kurrachèensis* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 13 and in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 23, fig. 3).

f_4 Palm of large chela ending in a strong anterior spine. Carpocerite 3,5—4-times as long as wide, superior spine of basicerite wanting . . . . . *Paulsoni* Nob. var. *liminaris* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 11 and in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 92).

e_2 Eggs large, producing mysis larvae. Palm of large chela unarmed. Carpocerite 2,9—3,1-times as long as wide. Basicerite a little shorter than the lower spine, superior spine almost wanting. Merus of third legs 4,5-times (♂), 4,3-times (♀) longer than wide . . . . . *Mac-Cullochi* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 13 and in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 92).

d_2 Carpocerite 3,75—3,8-times as long as wide. Palm of large chela with an obtuse tubercle on the anterior margin. Lower spine of basicerite as long as the basal part, upper angle subacute, with no spine. Merus of third legs 4,6—5-times as long as wide. Rostrum slender, extending to the 2nd third part of median antennular article . . . . . *gracilirostris* de Man

c_2 Terminal spine of scaphocerite shorter than the carpocerite.

d_1 Palm of large chela with a feeble flattened prominence on the anterior margin. Chela 2,6-times as long as high. Carpocerite 3,6-times as long as wide. Stylocerite not longer than the lower spine of basicerite. . . . . *Mushaensis* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 12 and in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 92).

d_2 Palm of large chela ending in a small, acute spine, chela 2,82-times as long as high. Carpocerite 3,5-times as long as wide. Stylocerite much longer than the lower spine of basicerite. Merus of third legs 3,66-times as long as wide. Ova large, 0,95 mm. long . . . . . *hilarulus* de Man

b_2 Large chela 2,35—2,5-times as long as high, palm unarmed. Carpocerite 2,66—2,71-times as long as wide, about as long as the terminal spine of the scaphocerite; upper spine of basicerite strong. Merus of third legs 3,12-times as long as wide. Rostrum shorter than basal antennular article. Eggs producing zoëae. . *Latastei* Cout. [1])

(H. COUTIÈRE, in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 25, fig. 7).

Biunguiculatus group.

a_1 Movable finger of the small chela tapering, not widened or enlarged laterally.

b_1 Posterior margin of 6th abdominal somite unarmed.

c_1 Merus of third legs unarmed.

d_1 Dactylus of small chela without a dorsal brush of hairs.

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1) COUTIÈRE's description of this species does not quite accord with his figures. The lateral spine of the basicerite should be as long as the stylocerite, but in the figures 7*a* and 7a_1 it appears much shorter; the terminal spine of the scaphocerite should usually slightly exceed the carpocerite, but in both figures it appears shorter.

e_1 Basicerite strongly spinous above, lower spine of basicerite not shorter than stylocerite.

f_1 Merus of third legs 3,2-times as long as wide, lateral frontal teeth triangular, subacute, rostrum hardly longer but much narrower than the lateral teeth, posterior margin of telson prominent, semicircular, with the outer angles straight or obtuse . . . . . *biunguiculatus* (Stimps.) Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 873, Pl. LXXI, fig 8).

f_2 Merus of third legs 4,2-times as long as wide, notches between the rostrum and the lateral teeth wider than in f_1, the lateral teeth narrower; merus of third legs at most 1,32-times longer than the propodus, in *Syn. biunguiculatus* 1,4-times. Dactylus of a less stout form. . *biunguiculatus* (Stimps.) Cout. var. *exilipes* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 874, Pl. LXXI, fig. 10).

e_2 Basicerite unarmed or almost unarmed above, lower spine of basicerite shorter than the stylocerite.

f_1 Third antennular article one-third longer than second. Upper spine of basicerite very reduced. Stylocerite reaching to the middle of median article. Palm of the large chela truncate. Merus of third legs 3-times as long as wide. *brachyceros* Nob.

(G. NOBILI, Ricerche sui Crostacei della Polinesia, Torino, 1907, p. 354, Tav. I, fig. 8).

f_2 Third antennular article shorter than second. Basicerite unarmed above. Stylocerite as long as basal article. Palm of the large chela with an acute, spiniform tooth at the anterior margin. Merus of third legs 4,8-times as long as wide . . . . . *amabilis* de Man

d_2 Dactylus of small chela bearing a dorsal brush of hairs. Basicerite unarmed above. Posterior angles of telson spinous. Merus of third legs 4,5-times as long as wide. . . . . *lophodactylus* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 7).

c_2 Merus of third legs with some movable spinules on the posterior margin. Lower spine of basicerite longer than the stylocerite, upper spine well-developed.

d_1 Palm of large chela ending anteriorly in one tubercle only, that is directed straight forward. Terminal spine of scaphocerite shorter than the antennular peduncle. Propodus of third legs of a rather stout form . . . . . *pachymeris* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 873, Pl. LXXI, fig. 9 (*Syn. biunguiculatus* (Stimps.) Cout. var. *pachymeris* Cout.)).

d_2 Palm of large chela ending anteriorly in two conical tubèrcles

that are placed abreast and directed obliquely upward and forward. Terminal spine of scaphocerite longer than the antennular peduncle. Propodus of third legs rather slender. *bituberculatus* de Man

b_2 Posterior margin of 6th abdominal somite armed with 2, 3, 4 or 7 spines or teeth. Basicerite spinous above.

c_1 Merus of third legs unarmed.

d_1 Posterior margin of 6th abdominal somite with an acute tooth at the outer angles. Posterior angles of the telson acute, but very short, merus of third legs 4-times as long as wide. *bispinosus* de Man

d_2 Posterior margin of 6th abdominal somite with a spine at the outer angles and one in the middle. Posterior angles of the telson spiniform, though short. Stylocerite longer than the rostrum, reaching beyond the middle of median article. Small chela 3,1-times as long as high, merus of third legs 4,5-times as long as wide . . . . . *triacanthus* de Man

d_3 Posterior margin of 6th abdominal somite with four teeth, two at the outer angles and two submedian.

e_1 Small chela 2,5-times longer than high, merus of third legs 3,05-times as long as wide. Lateral frontal teeth obtuse, much wider and a little longer than the rostrum . . . *quadridens* de Man

e_2 Small chela 3,42—3,46-times longer than high, merus of third legs 3,55—4-times as long as wide. Lateral frontal teeth as long as the rostrum, obtuse . . . . . *quadrispinosus* de Man

c_2 Merus of third legs armed with 7 or 8 movable spinules.

d_1 Posterior margin of 6th abdominal somite with an acute spine at the outer angles and with a third that is slightly shorter, in the middle. Posterior angles of telson spiniform, large. Anterior margin of the palm of large chela with one conical tooth or tubercle . . . . . *trispinosus* de Man

d_2 Posterior margin of 6th abdominal somite armed with seven acute spines. Posterior angles of telson acute, though very short. Palm of large chela anteriorly with two tubercles, the inner tubercle twice as large as the outer . . . . . *septemspinosus* de Man

a_2 Movable finger of the small chela enlarged laterally, more or less spatuliform and excavate.

b_1 Superior angle of basicerite subacute or at most with a small spine. Median part of the posterior margin of the telson wider than the lateral parts in which the spinules are inserted.

c_1 Carpocerite at most 6-times as long as wide. Anterior pair of spinules of the upper surface of the telson situated near the lateral margins.

d_1 Terminal spine of scaphocerite shorter than the antennular peduncle.

e_1 Lateral spine of basicerite not yet reaching to the middle of median antennular article, terminal spine of the scaphocerite not yet extending to the middle of third article; fingers of the smaller chela hardly shorter than the palm, the proportion to the total length being as 1 : 2,25 . . . . . *neptunus* (Dana)

(J. D. DANA, U. S. Explor. Exp. Crustacea, p. 553, Pl. XXXV, fig. 5. — Confer also: H. COUTIÈRE, in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 87—89, fig. 53).

e_2 Lateral spine of basicerite reaching the apex of median antennular article, terminal spine of scaphocerite extending to the distal 3rd part of third antennular article; proportion between the length of the fingers of small chela and the total length as 1 : 2,7, the fingers shorter than in *Syn. neptunus*. . . *Theano* de Man

d_2 Terminal spine of scaphocerite much longer than the antennular peduncle and even slightly reaching beyond the carpocerite. Lateral spine of basicerite not yet reaching to the apex of median antennular article. Proportion between the length of the fingers of the small chela and the total length as 1 : 2,5 [1]) . *laticeps* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 874, Pl. LXXII, fig. 11).

c_2 Carpocerite 9-times as long as wide. Anterior pair of spinules of the upper surface of the telson arranged in a regular quadrate, rather far distant from the lateral margins. Terminal spine of scaphocerite a little shorter than antennular peduncle, outer margin of scaphocerite very concave, blade rudimentary, reaching to the middle of median antennular article. Antennular peduncle 6-times as long as wide. Ova large, 1,46 mm. long . . . . . *Antenor* de Man

b_2 Superior spine of basicerite extraordinarily large, half as long as the lower that almost reaches to the middle of median antennular article. Median part of the posterior margin of telson extremely narrow, less broad than the lateral parts, spinules of the upper surface very large. Small chela as in *Syn. laticeps* Cout. . . . . *Pescadorensis* Cout.

Remarks to the preceding keys.

To the *Neomeris* group also appertains *Syn. merospiniger* Cout. (Bulletin Soc. Philom. Paris, 1908, p. 5). The place of this species in the key is uncertain, because nothing is known about the length of the ventral or principal hook with regard to the length of the dactyli that are biunguiculate. Merus of third legs spiniferous. The ventral or principal hook is hardly thicker than the other and its margins are curved: through this character this species may easily be distinguished from those of the section a_1 b_1, to which it belongs.

1) This number has been deduced from the figure 11*a* in COUTIÈRE's paper.

It is to the *Paulsoni* group that also ought to be referred *Syn. tricuspidatus* (Heller), a species described by C. Heller in: Sitzungsber. Kais. Akad. Wien, Bd. XLIV, 1861, p. 267, Pl. III, fig. 15 and of which I have treated in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 738—742. According to Heller's description the terminal spine of the scaphocerite should somewhat ("etwas") reach beyond the tip of the blade and the carpocerite should be much longer than the latter ("Der Stiel der äusseren Antennen überragt den Vorderrand der Deckplatten bedeutend"). I therefore conclude that in *Syn. tricuspidatus* the terminal spine of the scaphocerite does not project beyond the tip of the carpocerite, a conclusion quite in harmony with my observations on the type specimen of *A. tricuspidatus* which was examined by me in 1897. That type specimen (de Man, l. c. p. 742) proved to resemble the specimens from the coast of Atjeh, in which (p. 739) the carpocerite reached just as far forward as the terminal spine of the scaphocerite. When this should be really the case, *Syn. tricuspidatus* should be a species different from *Syn. Paulsoni* and its varieties, from *Syn. Theophane* de Man, *Syn. Mac-Cullochi* Cout. and *Syn. gracilirostris* de Man. In *Syn. tricuspidatus* the posterior angles of the telson are acute, but very short (l. c. p. 740) and this species is therefore also differentiated from *Syn. hastilicrassus* Cout., *acanthitelsonis* Cout. and *ancistrorhynchus* de Man; it appears by this feature related to *Syn. hululensis* Cout. and to *Syn. tumidomanus* (Paulson). In *Syn. hululensis*, however, the merus of third legs is more than 4-times as long as wide (H. Coutière, Alpheidae Mald. and Lacc. Archip. 1905, p. 877), in *Syn. tricuspidatus* somewhat more than 3-times (de Man, l. c. p. 742). *Syn. tumidomanus* (Paulson) is only known to me by the figure and the few remarks given by Coutière in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 24, so that I am unable to say whether it is identical with *Syn. tricuspidatus* or not.

Syn. Mushaensis Cout. appears also related, but in this species the stylocerite is not longer than the lower spine of the basicerite, while in *Syn. tricuspidatus* this spine is probably shorter than the stylocerite (de Man, l. c. p. 739).

Syn. hilarulus de Man and *Syn. Latastei* Cout. are apparently also different forms, *Syn. tricuspidatus* will therefore perhaps prove to be a species that is different from all those mentioned in the key.

Paulson has also described a variety *gracilimanus* of his *Syn. tumidomanus* (Coutière, Les Alpheidae, 1899, p. 26). In another paper of the latter author, in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 10, this variety, which is fully unknown to me, bears the name of *exilimanus*.

Alpheus spiniger Stimps., finally, from the Loo Choo Islands, may also belong to the *Paulsoni* group, but it appertains perhaps to the *Comatularum* group, in the neighbourhood of *Syn. carinatus*: it appears impossible to decide this question (Stimpson, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 31).

Alpheus biunguiculatus Stimpson (in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 31) ought in my opinion to be considered as a nomen nudum. The few characters indicated by Stimpson are in reality applicable to more than one species, to *Syn. brachyceros* Nob. for instance. The quite different habitat of Stimpson's *A. biunguiculatus* (Hawaiian Islands) and of Coutière's species of the same name (Maldive Archipelago) render it also doubtful whether

both forms are identical. As well STIMPSON's *Syn. biunguiculatus* as *Syn. brachyceros* Nob. are perhaps identical with *Syn. prolificus* (Sp. Bate) (Report Challenger Macrura, p. 556, Pl. XCIX, fig. 4), a species that also occurs at the Hawaiian Islands but that is insufficiently known, because in the only specimen, a female, which was captured by the "Challenger", the first pair of legs were missing. In fig. 4*c* of SPENCE BATE's Report the third antennular article appears decidedly longer than the second, just as is the case in *Syn. brachyceros*!

I. *Comatularum* group.

† 1. *Synalpheus amboinae* (Zehntner).

Alpheus amboinae L. Zehntner, Crustacés de l'Archipel Malais, Genève 1894, p. 202, Pl. VIII, fig. 23, 23*a*, 23*b*.

Stat. 50. April 16/18. Bay of Badjo, West coast of Flores. Depth up to 40 m. Mud, sand and shells, according to locality. 1 specimen of medium size.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands (Pearl-banks). 13 m. Sand and shells. 1 young specimen.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 very young specimen.

Stat. 303. February 2/5. Haingsisi, Samau-island. Depth up to 36 m. Lithothamnion-bottom. 1 adult specimen, without the large cheliped.

In the young specimen from Stat. 273 the rostrum just reaches beyond the 2nd antennular article and its tip as also the tips of the slightly divergent, orbital spines are a little curved upward; in the still younger specimen from Stat. 282 the rostrum reaches even to the middle of the 3rd article, but it projects straight forward, whereas the orbital spines that are parallel, are also hardly curved upward. In the specimen from Stat. 50 the rostrum extends to the middle and in the adult specimen from Haingsisi just beyond the middle of the 2nd article and in both rostrum and orbital spines that run parallel, project straight forward. The subacute rostral carina is separated by deep grooves from the orbital hoods which are rounded above.

The antennular peduncle accords with ZEHNTNER's description and is as long as the carpocerite; the blade of the scaphocerite extends to the middle of the 3rd antennular article and the outer margin that runs like a S, ends in a spine which is slightly curved inward and which reaches for a short distance beyond the apex of the blade, extending as far forward as the inner peduncle; the lower spine of the basicerite is as long as the orbital spines, but the upper spine which is slightly directed upward, measures but one-third of the lower.

In the adult male from Stat. 303 the rounded, lower margin of the first abdominal pleura is produced posteriorly into an acute tooth or spine directed backward; those of the second somite carry also an acute tooth at the posterior angle and the four following end in a similar, pointed, acute tooth. The telson is 3,2-times as long (3,06 mm.) as its posterior margin is broad (0,95 mm.) and the greatest width anteriorly is 2,5-times that of the posterior margin; in ZEHNTNER's type, that is lying before me, the proportion between the length of the telson and the width of the posterior margin is 3,6 and the telson appears anteriorly a little less broad, in the young specimen, finally, from Stat. 273 the length of the telson is 4,5-times that of the posterior margin. The anterior pair of spinules which are of a rather large size,

0,42 mm. long, and inserted close to the lateral margins, are situated immediately behind the middle and between the spinules one observes a shallow, median groove that does not reach to the base of the telson. The inner uropod is rather narrow; in ZEHNTNER's type it is 1,8-times, in the specimen from Stat. 303 1,7-times as long as broad.

In the young specimen from Stat. 282 the large chela has a somewhat stouter form than in those taken at the Stations 50 and 273, probably owing to its very young age. Whereas in the adult specimens the 1st carpal segment of the second legs is longer than the sum of the four following, in the young individuals one observes the contrary.

In the specimens from the Stations 303 and 273 the meri of the 5th pair are unarmed, but in that from Stat. 282 they carry a small distal tooth as in the type; in the specimen from Stat. 50 the legs of the 5th pair are missing. In ZEHNTNER's type the merus of the legs of the 3rd pair is 5,7-times, in the specimen from Stat. 303 5,5-times and in the young specimen from Stat. 273 5,3-times as long as broad; carpus a little less than half as long as the merus, 3-times as long as thick and in the type one observes three small spinules, long 0,2 mm., at the far end of the posterior margin. Propodus twice as long as the carpus, in the type 8,5-times, in the specimen from Stat. 303 7,7-times as long as broad; dactylus about one-sixth the propodus, strongly curved with a small and slender accessory claw on the posterior margin.

The specimen from Stat. 303 is 24,5 mm. long, those from the Stations 50, 273 and 282 are respectively 15,5 mm., 14 mm. and 11 mm. long.

General distribution: Amboina (ZEHNTNER).

† 2. *Synalpheus consobrinus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 111.

Stat. 91. June 22. Muaras-reef, inner side, east coast of Borneo. 2 specimens, one of which with eggs.
Stat. 213. September 26—October 26. Saleyer-anchorage. Reef. 1 specimen.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 2 specimens, one of which with eggs.
Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 young specimen.
East of Segli, north-coast of Sumatra, at a depth of 40—70 fathoms, 1 adult, egg-bearing female collected by Mr. J. W. VAN NOUHUYS, May 1909.

These specimens bear a close resemblance to *Synalpheus Stimpsonii* from Amboina (J. G. DE MAN, in: Archiv f. Naturg. 53. Jahrg. 1888, p. 513, Pl. XXII, fig. 3—3*c*), there are, however, some differences so that I prefer to describe them as a new species. Unfortunately they do not fully accord with one another. The specimen from Stat. 213, a male, is the largest of all, 21 mm. long, and will be described as the type.

Frontal region as in *Syn. Stimpsonii*, but the rostrum, that projects straight forward and that is hardly longer than broad at its base, is shorter and reaches to the distal fourth or fifth of the visible part of 1st antennular article; the slightly convergent, orbital spines measure one-third the rostrum, as in *Syn. Stimpsonii*. Posterior angle of 1st and 2nd abdominal pleura

subacute, the following also, the 6th rather acute. The lateral margins of the telson converge rather strongly, so that it appears 4,5-times as long (2,7 mm.) as its posterior margin is broad (0,6 mm.) and the latter is not at all prominent in the middle; the greatest width anteriorly is 3,4-times as broad as the posterior margin. One observes a shallow and narrow, longitudinal furrow in the mid-line, but this furrow does not extend to the base. The anterior pair of spinules, which are rather small, 0,22 mm. long, and inserted close to the lateral margins, are situated rather far backward, their distance from the posterior margin being in proportion to the length of the telson as 1 : 2,7; the posterior pair is a little farther remote from the posterior margin than from the anterior pair. In the closely allied *Syn. amboinae* (Zehntner) the spinules of the upper surface are larger and situated more forward. Inner uropod just one and a half as long as broad, distinctly broader than in *Syn. amboinae*. When the figure 3 of my cited paper is indeed accurate, the visible part of first antennular article should be, in *Syn. Stimpsonii*, little longer than the second; after the description the first article should be twice as long as the second, but perhaps that part of the first which is covered by the front, has been included. In the male from Stat. 213 the visible part of first article appears twice as long as the second, and the second one-third longer than the third; the stylocerite just projects beyond the first article. As in *Syn. Stimpsonii* the carpocerite is as long as the antennular peduncle, but, different from this species, the lower spine of the basicerite extends a little farther forward than the orbital spines; upper spine of the basicerite very small, one-third of the lower. As in *Syn. Stimpsonii* the terminal spine of the scaphocerite attains the apices of the peduncles, but, otherwise as in this species, it is not or hardly curved inward and it projects by one-third of its length beyond the rounded tip of the blade; the blade, however, hardly reaches beyond the apex of second antennular article.

The external maxillipeds reach as far forward as the carpocerites.

The upper margin of the merus of the large cheliped which is 3-times as long as broad, ends in a small, acute tooth, outer margin with the apex acute, that of the infero-internal margin obtuse. Anterior margin of the upper face of the carpus with a small, acute tooth, posterior margin also terminating in an acute tooth. Chela almost one and a half as long (12,5 mm.) as the carapace, rostrum included, (8,75 mm.), 4-times as long as high; the chela presents its greatest height at the proximal third, about as in *Syn. Stimpsonii*. Fingers 4,5 mm. long, a little more than half as long as the palm; dactylus less strongly curved and less high than that of *Syn. Stimpsonii*, its cutting-edge presenting a small, acute tooth not far from the tip, whereas in *Syn. Stimpsonii* the edge appears entire. Palm with a small, acute tooth at the far end of the inner face, immobile finger resembling that of *Syn. Stimpsonii*. The small cheliped is missing.

First carpal segment of 2nd legs one-sixth longer than the sum of the four following, second segment a little longer than the third and the fourth that are equal, fifth one and a half as long as the second; the chela, the fingers of which are slightly longer than the palm, is 2,5-times as long as the fifth segment.

In the following legs the ischium is unarmed. Merus of third legs 6,2-times as long as broad, armed with a moderately strong, acute tooth at the far end of the posterior margin;

carpus almost half as long as the merus, 3-times as long as thick and with 2 small, movable spinules, long 0,18 mm., at the far end of its posterior border. Propodus twice as long as the carpus, 8,4-times as long as broad, its posterior margin armed with 15 small spinules and both margins beset with tufts of rather long setae; dactylus one-sixth the propodus, differing from that of *Syn. Stimpsonii* by the accessory claw that makes a right angle with the posterior margin and that appears almost as thick as the principal claw; the latter appears more slender than in the figure 3*c* of my quoted paper. The carpus and the merus are also setose along their margins. While the merus of the 4th legs bears the same tooth as that of the 3rd, in the 5th legs this joint is unarmed, like as in *Syn. Stimpsonii*.

The male from Stat. 282, of the same size as the preceding one, fully accords with it, but the large cheliped is missing. Brachium of small cheliped 4-times as long as broad, upper margin terminating in a small, acute tooth, the lower margins as in the large cheliped. Small chela half as long as the carapace, 4-times as long as high, fingers half as long as the palm, shutting together and of equal length. The egg-bearing female has also nearly the same size, but the rostrum reaches the end of first antennular article. Eggs ovoid, not very numerous and rather large, 0,7 mm. long.

The male from Stat. 91 is 15 mm. long. Rostrum one and a half as broad at its base as it is long, a little shorter than first antennular article, orbital spines also as in the type. This is also the case with the antennal and antennular peduncles, but the visible part of the first antennular article appears only one and a half as long as the second. Telson typical, 4,3-times as long as its posterior margin is broad, the width of the latter one-third the width at the base; spinules on the upper surface typical. The large chela, however, closely resembles that of *Syn. Stimpsonii* (de Man, l. c. fig. 3*a*), the dactylus has quite the same form and the cutting-edge is entire. The following legs agree also with this species, for the 3rd—5th legs are of a somewhat stouter shape than those of the typical specimens from the Stations 213 and 282. So e. g. the merus of 3rd legs appears 5-times as long as broad, the carpus is almost half as long as the merus, 3-times as long as thick and bears 3 short spinules at the far end of the posterior margin; the propodus is almost twice as long as the carpus and 6-times as long as broad; the accessory hook, finally, of the dactylus, though being also at a right angle with the posterior margin, appears somewhat smaller.

In the ova-bearing female from Stat. 91 which has the same size as that from Stat. 282, the rostrum just reaches beyond the first antennular article, the visible part appears as long as in the preceding male. The stylocerite reaches to the 2nd third of second antennular article. The carpocerite is somewhat longer than the antennular peduncle, the blade of the scaphocerite reaches to the tip of that peduncle, but the terminal spine, that extends as far forward as the carpocerite, projects only with $^1/_8$ or $^1/_9$ of its length beyond the tip of the blade, but is not curved inward. Telson typical, but only 3,8-times as long as its posterior margin is broad. It appears doubtful whether the large cheliped that is lying loose in the bottle, belongs really to this female; the infero-internal margin of the brachium is namely armed with a strong acute tooth at the far end, the anterior border of the upper face of the carpus bears three acute teeth and the posterior border ends in a strong acute tooth; the fingers are shorter, the dactylus

shorter than the immobile finger and its upper margin is more strongly arcuate. The eggs are a little larger than those of the typical female from Stat. 282, they are 0,9 mm. long.

The young male from Stat. 305 is 11 mm. long. The rostrum extends to the middle of second antennular article, but the orbital spines that are a little turned outward, measure but one-fourth the length of the rostrum. The antennular peduncle fully agrees with my figure 3 (l. c.) of *Syn. Stimpsonii*, the visible part of the first article is but one-fourth longer than the second, but the stylocerite is somewhat shorter than the first article. Carpocerite a little longer than the antennular peduncle, the blade of the scaphocerite reaches only to the end of the second article and the terminal spine, that is not curved inward and that extends by one-third of its length beyond the tip of the blade, appears as long as the antennular peduncle. The lower spine of the basicerite reaches a little less forward than the orbital spines.

The telson is typical, 4-times as long as the posterior margin is broad, width at the base 3-times as broad as the posterior margin; the spinules of the upper face are arranged as in the typical specimens from the Stations 213 and 282. The larger cheliped resembles that of *Syn. Stimpsonii*, the other chela is hardly half as long as the larger and much smaller. First carpal segment of 2nd legs a little shorter than the sum of the four following, the 2nd—4th segments are equal in length. The following legs show the same somewhat stouter shape as the specimens from Stat. 91, but the almost rudimentary accessory claw of the dactylus is directed as in the figure 3*c* of my quoted paper.

The female, collected by Mr. VAN NOUHUYS east of Segli, is 24 mm. long and larger than all the specimens collected by the "Siboga"; in its features and outer appearance it much resembles the egg-bearing female from Stat. 91. The eggs are also 0,9 mm. long. The frontal spines are abnormally developed. The rostrum that just reaches beyond the 1st antennular article, is slightly turned to the right and bears, just behind the middle of its left margin, a small, acute spine, somewhat directed outward; the right orbital spine is directed straight forward, but the left distinctly outward. At either side of the body the lower spine of the basicerite is slightly turned outward and appears as long as the lateral frontal spines.

The visible part of 1st antennular article is one and a half as long as the 2nd and the 2nd almost twice as long as the 3rd. The stylocerite of the left peduncle extends to the apex of 1st article and its tip is slightly curved outward; the stylocerite of the right peduncle, however, is directed straight forward and decidedly a little shorter than 1st article. The carpocerite hardly reaches a little beyond the antennular peduncle, the terminal spine of the scaphocerite is as long as this peduncle and the scale reaches just beyond the apex of the 2nd article.

Unfortunately the large cheliped is wanting, the smaller fully agrees with that of the female from Stat. 91. The upper margin of the merus terminates in a small spine, fingers hardly more than half as long as the palm. First segment of the carpus 5,6-times as long as wide at the distal extremity, its length in proportion to the sum of the four following segments as 113 : 94, 2nd segment just as long as the 4th and slightly longer than the 3rd, 5th segment almost twice as long as the 2nd, chela a little more than twice as long as the 5th segment, fingers one-third longer than the palm. The measurements of the 3rd legs are: merus 2,1; carpus 1; propodus 1,8. Merus 5,5-times longer than wide, propodus 7,25-times; the propodus

bears 16 rather short spinules, that are 0,2 mm. long, on the outer side of the posterior margin, while, along the distal third of the joint, each spinule is accompanied by another on the inner side of the margin. The ventral hook of the dactylus is broken off and the other leg is missing. These legs are very setose.

The telson shows also the same measurements as the female from Muaras-reef. The length equals 3,78-times the width of the posterior margin and the latter measures one-third the greatest width. The spinules of the upper surface are 0,26 mm. long, proportion between the length of the telson and the distance of the anterior pair from the posterior margin 2,7, proportion between the distances of both pairs from the posterior margin 1,73.

Remarks. The form which was referred by SCHENKEL to a variety of *Syn. Stimpsonii* (in: Beitrag zur Kenntniss der Dekapodenfauna von Celebes, 1902, p. 567, Pl. XIII, fig. 22*a*—*c*), seems really to belong to this species and not to *Syn. consobrinus*, because the terminal spine of the scaphocerite hardly reaches beyond the blade and because it is curved inward.

Further researches must decide whether *Syn. consobrinus* and *Syn. Stimpsonii* are indeed different species or whether *Syn. Stimpsonii* is a much variable form as regards the terminal spine of the scaphocerite extending more or less far beyond the blade, as regards the length of the visible part of first antennular article, as regards the length of the lower spine of the basicerite in proportion to the orbital spines, as regards the shape of the 3rd—5th legs etc.

† 3. *Synalpheus odontophorus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 113.

Stat. 65a. May 6. Near Tanah Djampeah. From 400 m. upward to 120 m. Pale, grey mud, changing during haul into coral bottom. 1 egg-bearing female.
Stat. 260. December 16 and 18. 5° 36'.5 S., 132° 55'.2 E. — 2,3 miles N. 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 1 egg-bearing female.
Stat. 289. January 20. 9° 0'.3 S., 126° 24'.5 E. 112 m. Mud, sand and shells. 1 egg-bearing female.

A new species of small size, characterized by the inner, upper side of the immobile finger of the large chela being armed with a characteristic strong tooth. Frontal region prominent as in the other species of this group, rostrum acute, one-sixth, one-seventh or even still less, longer than broad at its base and reaching to the middle or to the distal third or fourth part of 2nd antennular article; rostral carina prominent, though rather obtuse, and separated by rather deep grooves from the orbits to the base of which it reaches; length of the rostral carina two-fifths the length of the carapace, rostrum included. The orbital spines that project, like the rostrum, straight forward, are short and measure only one-fourth the length of the rostrum; they are slightly directed outward.

First abdominal pleura truncate, second and third rounded, fourth and fifth subacute, sixth acute. In the specimens from the Stations 260 and 289 the telson is 4,5-times, in that from Stat. 65a 4-times as long as the posterior margin is broad and in all the specimens the greatest width anteriorly is 3-times as broad as the posterior margin, the lateral margins converging rather strongly; the outer angles of the posterior margin are acute, though not prominent and

the posterior margin projects but little in the middle; the longer, inner spinules measure two-thirds the width of the posterior margin. As regards the arrangement of the spinules of the upper surface, that are 0,16 mm. long, the three specimens do not agree with one another. In the female from Stat. 289 the two anterior spinules either of which is situated almost as far from the lateral margin as from the mid-line, are inserted at the anterior third and the posterior pair is nearly twice as far distant from the posterior margin as from the anterior pair. In the two other specimens the anterior pair is situated a little more backward, its distance from the posterior margin being three-fifths the length of the telson and in both specimens the posterior pair is situated just midway between the posterior margin and the anterior pair. Inner uropod 1,6-times as long as broad.

Second joint of antennular peduncle one-fourth shorter than the visible part of the first, third joint a little shorter than second; the acute stylocerite that distinctly projects beyond the orbital spines, reaches to the middle or to the distal third of the visible part of first antennular article.

Lower spine of basicerite small, reaching to or hardly beyond the base of the rostrum proper, upper spine half as long; both spines are sometimes directed outward. Carpocerite hardly longer than the antennular peduncle and of a rather stout shape, appearing 3,2-times as long as broad when measured at the lower side; the rounded tip of the blade reaches to the middle of third antennular article, but the terminal spine of the scaphocerite, the outer margin of which is slightly concave, is not curved inward, extends by one-fifth of its length beyond the tip of the blade and reaches as far forward as the carpocerite.

The external maxillipeds extend to the end of second antennular article.

Of the large cheliped of the female the merus is 2,4-times as long as broad, its upper margin ends in a small, acute tooth, the apices of the two lower margins are also acute, though presenting no proper tooth. The lower side of the very short carpus is produced into a long acute tooth and one observes a smaller, acute tooth on the anterior margin of the upper side. Chela a little, viz. one-seventh, longer than the carapace, rostrum included, much resembling that of *Syn. consobrinus*, 3,17-times as long as high, presenting its greatest height at the proximal third. Fingers a little less than half as long as the chela, the palm about one and a half as long as the fingers, the chela being 2,63-times as long as the fingers and the palm being in proportion to the fingers as 1 : 0,61. The palm is everywhere rounded, somewhat narrowing distally and bears, as in *Syn. consobrinus*, a small, acute tooth at the far end of its inner (upper) face. As regards the shape of the dactylus and of the lower (outer) face of the immobile finger, this species does not differ from *Syn. consobrinus*, but this is not the case with the upper (inner) side of the immobile finger. The distal lobe, indeed, is much larger, not rounded as in *Syn. consobrinus*, but produced into an acute tooth which is directed obliquely upward and forward. The distal half of this finger is, moreover, considerably broadened and, as the distal margin of the lobe runs obliquely downward, the immobile finger appears excavate, when the fingers are looked at from the tips.

Merus of small cheliped somewhat more slender than that of the larger, 3,7-times as long as broad, armed in the same manner; carpus thicker, upper border with an acute tooth;

chela very small, its length being only one-third that of the larger, fingers just half as long as the palm, which is unarmed and twice as long as high.

First carpal segment of 2nd legs 5-times as long as thick, 1,2 mm. long, slightly shorter than the sum (1,4 mm.) of the four following segments; the three following subequal, the fifth as long as the third and the fourth taken together; the chela, the fingers of which are longer than the palm, is somewhat more than one and a half as long as the fifth segment.

Merus of third legs 5,5-times as long as broad, armed with a rather small, acute tooth at the distal end of posterior margin; carpus almost 3-times as long as thick distally, with a small spinule, long 0,09 mm., at the far end of the posterior margin. Propodus twice as long as the carpus, almost 7-times as long as broad, its posterior margin presenting 16 small spinules; dactylus one-fifth the propodus, of a rather stout shape, 3-times as long as broad at base, with a small, ventral, accessory claw that is half as long and half as broad as the principal and that makes an obtuse angle with the posterior margin. Apical tooth of the merus of 4th legs smaller than that of the 3rd, merus of 5th legs unarmed.

Eggs few in number, ovoid, large; those of the female from Stat. 65a are 1 mm. long, whereas the eggs of the specimens taken at the Stations 289 and 260 are respectively 0,75 mm. and 0,7 mm. long.

Length of the ova-bearing female 15 mm., the three females are of the same size.

†4. *Synalpheus carinatus* (de Man).

Alpheus carinatus J. G. de Man, in: Archiv f. Naturg. Bd. 53. 1888, p. 508, Pl. XXII, fig. 2.
Alpheus carinatus L. Zehntner, Crustacés de l'Archipel Malais, Genève 1894, p. 201.
Alpheus carinatus H. Coutière, in: Notes from the Leyden Museum, Vol. XIX, 1898, p. 206.
Nec: *Synalpheus carinatus* J. Pearson, On the Macrura, in: Herdman's Report on the Pearl Oyster Fisheries, 1905, p. 83, Pl. II, fig. 9.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 9—22 m. Mud, coral and coralsand. 1 ova-bearing female of medium size and 1 still younger male.
Stat. 181. September 5/11. Ambon-anchorage. Reef. 1 adult, ova-bearing female.
Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 young female without eggs and 1 still younger male.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 very young specimen.

The adult female from Amboina is 34 mm. long from tip of rostrum to the end of the telson. The rostrum hardly reaches beyond the 2nd antennular article and is very slightly upturned at the tip; rostral carina sharp, prominent, reaching to near the posterior margin of the carapace and distinctly notched at the limit between the gastric and cardiac regions. Orbital spines half as long as the rostrum, parallel and directed obliquely upward; their carinae are traceable to beyond the middle of the carapace, but they are obtuse and much less prominent than the median carina; the inner, lower margin of the left orbital spine bears two acute teeth, an abnormality indeed, for in this species the orbital spines are simple and unarmed.

The pleura of the 4th—6th somites end in a pointed tooth. Telson 3,41-times as long (4,3 mm.) as its posterior margin is broad (1,26 mm.), its greatest width (2,76 mm.) a little

more than twice as broad as the posterior margin. The distance between the anterior pair of spinules and the posterior margin is in proportion to the length of the telson as 0,43 : 1; these spinules being situated even a little more forward than in my figure 2*a* (l. c.), in accordance with the large size of this specimen.

Brachium of small cheliped more slender than that of the large, the upper margin and the infero-external margin terminate in an acute, pointed tooth, but instead of the posterior tooth that is observed on the infero-external margin of the merus of the large cheliped, there is a small, obtuse prominence. Carpal segments of the left leg of the 2nd pair (the right is missing) 3,3 mm., 0,8 mm., 0,7 mm. 0,65 mm. and 1,12 mm. long; the chela is 1,8 mm. long (palm 0,8 mm., fingers 1 mm.). In this full-grown specimen the first segment appears even very slightly longer than the four following taken together.

In the three posterior legs the ischium is unarmed. In my original description nothing is said about the eggs: in this specimen they are very numerous; ovoid, 1 mm. long, 0,6 mm. thick.

The egg-bearing female from Stat. 33 is 24,5 mm. long, the ova are 0,9 mm. long, and the telson is more narrowed posteriorly, being $4^2/_3$-times as long as its posterior margin is broad.

In *Syn. carinatus* the proximal extremity of the S-like curved, outer margin of the scaphocerite is produced into a spine: in the adult female from Amboina this spine is rather small and directed outward, in the young male from Stat. 33 it is well-developed and directed straight forward. This spine is often broken off.

In the young specimen, long 12 mm., from Stat. 315 the rostrum reaches almost the end of second antennular article, but the rostral carina only extends to the posterior fourth of the carapace. The first carpal segment of the 2nd legs is much shorter than the sum of the four following.

Remarks. The specimen which was referred by ZEHNTNER to this species, was examined by me and no doubt belongs to this species. The rostrum that appears somewhat asymmetrical, is apparently regenerated. The species, however, which was referred by PEARSON to *Syn. carinatus*, is certainly another, the second antennular article is hardly shorter than the first, the telson has a quite different form etc.

General distribution: Amboina (DE MAN, ZEHNTNER).

† 4*a*. *Synalpheus carinatus* (de Man) var. *binongcensis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 111.

Stat. 220. November 1/3. Anchorage off Pasir Pandjang, West coast of Binongka. 55 m. Coral sand. 1 ova-bearing female, collected on a *Comatula*.

This specimen, 25 mm. long, is described as a variety, because the ovoid eggs are larger, 1,2 mm. long, and less numerous than those of the female taken at Amboina, which was referred to the typical species. The rostrum, reaching almost to the end of second antennular article, is continued to near the posterior margin of the carapace, but, different from the typical female from Amboina, is not notched at the limit between the gastric and cardiac regions. The carinae of the orbital spines that are half as long as the rostrum, slightly convergent,

but in a less degree turned upward than in the female from Amboina, may be followed to the middle of the carapace. The telson has a different form, its posterior margin (0,78 mm.) measures just one-fourth the length (3,12 mm.), but anteriorly the telson appears broader, 2,6-times as broad (2,04 mm.) as the posterior margin; the spinules of the upper surface are inserted a little more backward, the proportion between the length of the telson and the distance between its posterior margin and the anterior pair of spinules being as 1 : 0,36.

Otherwise as in the typical species the carpocerite appears longer, extending beyond the antennular peduncle by one-half the third article.

The large cheliped is missing, the following legs are as in the typical species.

4*b*. *Synalpheus carinatus* (de Man) var. *ubianensis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 111.

Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 1 ova-bearing female.

Stat. 220. November 1/3. Anchorage off Pasir Pandjang, West coast of Binongka. Reef. 1 ova-bearing female and 1 younger male.

It is again because of the size of the eggs that these specimens are considered as a distinct variety: the ova are namely very small, 0,4—0,48 mm. long, and a little less thick. The female from North-Ubian is 21 mm. long, the two other specimens are of a somewhat smaller size. Rostrum and orbital spines as in the typical species, the rostrum just reaching beyond the second antennular article, but the carinae of the orbital spines are inconspicuous and the rostral carina is not notched.

Telson in the female from Stat. 99 $4^{7}/_{16}$-times, in that from Stat. 220 4,8-times as long as the posterior margin is broad; in the former the proportion between the greatest width near the base and that of the posterior margin is 2,6, in the specimen from Stat. 220 just 3. The anterior pair of spinules of the upper surface are inserted just in front of the posterior third, the proportion between the length of the telson and that distance from the posterior margin being in the female from North-Ubian 2,84, in the other 2,6. Thoracic legs as in the typical species, but the second, third and fourth carpal segments of the second legs are of equal length, the second being hardly longer than the third or the fourth.

II. *Neomeris* group.

† 5. *Synalpheus neomeris* (de Man).

Alpheus minor, var. *neptunus* Dana, J. G. de Man, in: Journal Linnean Soc. London, XXII, 1888, p. 272.

Alpheus neomeris J. G. de Man, in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 734 (partim).

Synalpheus neomeris G. Nobili, in: Bull. Scientif. France et Belgique, XL, 1906, p. 25.

? *Synalpheus neomeris* H. Coutière, Les "Alphéidae", 1899, p. 259, fig. 318 and in: Alpheidae Mald. and Laccad. Archip. 1905, p. 869, Pl. LXX, fig. 1 and in: Bull. Soc. Philom. Paris, 1908, p. 5.

Nec: *Synalpheus neomeris* J. G. de Man, in: Abhandl. Senckenb. Naturf. Ges. XXV, 1902, p. 891.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 1 male of medium size.
Stat. 99. June 28/29/30. 6° 7′.5 N., 120° 26′ E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 1 adult male and 1 adult, ova-bearing female.
Stat. 164. August 20. 1° 42′.5 S., 130° 47′.5 E. 32 m. Sand, small stones and shells. 3 adult, ova-bearing females and 2 younger males.
Stat. 258. December 12/16. Tual-anchorage, Kei-islands. 22 m. Lithothamnion; sand and coral. 25 specimens, males and ova-bearing females and young specimens.
Stat. 299. January 27/29. 10° 52′.4 S., 123° 1′.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Depth up to 40 m. Lithothamnion. 1 adult male.
Stat. 320. February 23. 6° 5′ S., 114° 7′ E. Java Sea. 82 m. Fine, grey mud. 1 young specimen.

In my Report on the Podophthalmous Crustacea of the Mergui-Archipelago, published in 1888, six specimens, 3 males and 3 females, of unequal size were referred by me to *A. minor* Say var. *neptunus* Dana. Two of these specimens, a male and an ova-bearing female, both 17 mm. long, preserved in my private collection, are lying before me. It was on these specimens from the Mergui-Archipelago that *Syn. neomeris* was founded by me in 1897 (l. c.). In this paper 9 other specimens of smaller size, collected by Capt. STORM on the coast of Atjeh, were also referred by me to this *Syn. neomeris*, but, as I now see, erroneously, for this Atjeh form, specimens of which are also lying before me, proved after a careful examination to belong to another species, viz. to *Syn. streptodactylus* Cout. In this paper of 1897 the figures 61*a* (large chela of the male), 61*d* (third leg of the male) and 61*e* (dactylus of this leg) are relative to the true *Syn. neomeris*, but the figures 61, 61*b* and 61*c* to *Syn. streptodactylus*. Many an author has probably been misled by this figure 61, which indeed does not represent *Syn. neomeris*. According to my description of 1888 the second antennular article should be "scarcely longer than the 1st"; in the typical male of *Syn. neomeris*, the cotype, that is lying before me, the second article, 1 mm. long and 0,6 mm. thick, appears a little shorter than the visible part, long 1,1 mm., of the first article, but in the female this visible part appears just as long as the second article, namely 0,9 mm. In all the specimens, collected by the "Siboga", the second article appears also a little shorter than the visible part of the first, the proportion is, however, somewhat variable. So, e. g., in the male from Stat. 299 the second article is one-fourth shorter than the visible part of the first, in the adult male from Stat. 99 one-sixth and in an ova-bearing female from Stat. 258 one-seventh. In all the specimens the third article is distinctly shorter than the second. The stout stylocerite, the outer margin of which is setose, reaches almost to the middle of the second article, as e. g. in an adult, ova-bearing female from Stat. 164; sometimes it extends just to the middle, as in the male from Stat. 299, or even slightly beyond the middle, as in the adult male from Stat. 99. In the two cotypes from the Mergui-Archipelago the stylocerite extends also to just beyond the middle of the second article.

The lower spine of the basicerite is turned outward at the tip and shorter than the stylocerite, but it reaches more or less beyond the apex of first antennular article; the length of the upper spine is one-third that of the lower. Carpocerite much longer than antennular peduncle, projecting with the whole length of third article beyond the tip of this peduncle; terminal spine of scaphocerite as long as the antennular peduncle, rounded tip of the blade extending to the distal third, or sometimes to the middle, of third article.

As in *Syn. Gravieri* the rostrum and the orbital spines are setose at their tips; the rostrum which is slightly upturned at the extremity and slightly longer than the orbital spines, reaches to the distal third or fourth of the visible part of first antennular article, sometimes, as in an adult female from Stat. 164, hardly beyond the middle. The orbital spines that are subacute — in an adult, ova-bearing female from Stat. 164 even rather obtuse — are much broader than the rostrum, slightly convex above and their tips are a little curved inward, just as in the Mergui cotypes. Telson rather elongate, proportion between its length and the width of the posterior margin varying from 3 to 3,43, greatest width anteriorly twice as large as the width of the posterior margin. The spinules of the upper surface are situated more backward and the two pairs are situated nearer to one another than those of *Syn. Gravieri*, as is proved by comparing the Table of measurements of both species.

The large chela accords with my figure 61 *a* (l. c. 1897). In my Report of 1888 nothing is said concerning the small chela, while in my paper of 1897 it is described as presenting nearly the same form as in *Syn. neptunus* (Dana) (Dana, Pl. 35, fig. 5 *d*). In the two cotypes from Mergui this is indeed the case: in Dana's figure the proportion between the length of the chela and the height of the palm appears to be 3,3, in the two Mergui specimens 3,4 and 3,35 and in either of them the fingers are slightly shorter than the palm. Now it is a remarkable fact that in the specimens collected by the "Siboga" the smaller chela shows a somewhat more slender shape, the proportion between the total length and the height of the palm varying between 3,8 and 4,33; the fingers are, in adult specimens, a little shorter, as long or slightly longer than the palm. The palm therefore usually appears a little more slender than in the cotypes from the Mergui-Archipelago, but in the adult male from Stat. 99 its shape is the same, the proportion between the length of the palm and its height being 1,8, in the Mergui specimens 1,77 and 1,7: it is therefore obvious that the stouter form of this chela in the specimens from the Mergui-Archipelago is only an individual feature — and that the specimens taken by the "Siboga" indeed belong to *Syn. neomeris*.

The 2nd legs resemble those of *Syn. Gravieri*. The first carpal segment is slender, 6-times as long as thick, and longer than the following segments taken together: in very young specimens, as in N° 6 of the Table of measurements, the first segment is stouter and slightly shorter than the following taken together. The number of spinules with which the meri of the third legs are armed, 3 in very young specimens, amounts to 4, 5, 6, even to 8 in larger and adult individuals; the meri of the fourth legs bear 2, 3 or 4 spinules, in young specimens only one. The dorsal hook of the dactylus of the third legs measures one-third the length of the principal one, its thickness is usually a little less than one-third, sometimes almost one-fourth that of the other; the dactyli of the fourth legs resemble those of the third. As regards these legs I refer to the Tables B and C of measurements.

Table A.

	N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Proportion between length of telson and width of posterior margin	3	3,25	3,1	3,24	3,2	3,43	3,375	3,3	3,33
Proportion between the greatest width and that of posterior margin	1,93	1,925	2,1	2,1	2,1	2,2	2,175	2,1	2,12

	N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	2,4	2,8	2,38	2,7	2,6	3,1	2,7	2,6	2,5
Proportion between the distances of the two pairs of spinules from the posterior margin	1,5	1,57	1,55	1,51	1,47	1,52	1,56	1,54	1,57

Table B.

	N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Length of small chela	4,7	3,85	7,8	5,2	5,24	6,8	4,94	3,86	1,85
Height of small chela	1,38	1,15	2,06	1,26	1,26	1,7	1,14	0,96	0,46
Proportion between length and height of the chela	3,4	3,35	3,8	4,12	4,16	4	4,33	4	4
Length of the fingers	2,26	1,9	4,1	2,6	2,62	3,4	2,54	1,96	0,85
Proportion between the length of the chela and that of the fingers	2,08	2,03	1,9	2	2	2	1,94	1,97	2,17
Proportion between length and height of the palm	1,77	1,7	1,8	2,07	2,08	2	2,1	1,98	2,2

Table C,

indicating the proportions between the length of the meri, carpi and propodi of the third and fourth legs.

		N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Merus	of third legs	2,64	2,45	2,72	2,62	2,33	2,7	2,68	2,68	2,44
Carpus	of third legs	1	1	1	1	1	1	1	1	1
Propodus	of third legs	2,18	2,1	2	2,08	1,88	2,1	2,1	2,21	2,35
Merus	of fourth legs	2,52	2,31	2,56	2,55	2,5	2,75	2,47	2,5	2,31
Carpus	of fourth legs	1	1	1	1	1	1	1	1	1
Propodus	of fourth legs	2,25	2,1	2,04	2,2	2,26	2,26	2,27	2,36	2,41

Table D.

		N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Length of merus	of third legs	2,9	2,7	4,46	3,15	3,1	4	3	2,3	1,1
Width of merus	of third legs	0,98	0,9	1,28	0,97	0,95	1,26	0,89	0,72	0,36
Proportion between length and width of merus	of third legs	3	3	3,48	3,25	3,26	3,17	3,37	3,2	3
Length of carpus from articulation to articulation	of third legs	1,1	1,1	1,64	1,2	1,3	1,45	1,12	0,86	0,45
Width of carpus	of third legs	0,58	0,55	0,88	0,65	0,66	0,84	0,62	0,48	0,26
Proportion between length and width of carpus	of third legs	1,9	2	1,86	1,84	1,97	1,73	1,8	1,8	1,7
Length of propodus	of third legs	2,4	2,3	3,3	2,5	2,44	3,05	2,4	1,9	1,06
Width of propodus	of third legs	0,5	0,48	0,71	0,55	0,52	0,71	0,51	0,42	0,24
Proportion between length and width of propodus	of third legs	4,8	4,8	4,65	4,54	4,7	4,3	4,7	4,5	4,42
Length of dactylus	of third legs	0,72	0,68	1,04	0,72	0,82		0,8	0,6	0,32
Length of dorsal hook with regard to the principal one	of third legs	0,33		0,33			0,36			0,43
Thickness of dorsal hook with regard to the principal one	of third legs	0,31		0,28	0,3	0,27	0,3			0,4

Table E.

		N° 1. ♂	N° 2. ♀	N° 3. ♂	N° 4. ♂	N° 5. ♂	N° 6. ♀	N° 7. ♀	N° 8. juv.	N° 9. juv.
Length of merus	of fourth legs	2,4	2,2	3,64	2,55	2,5	3,3	2,4	1,8	0,9
Width of merus		0,77	0,715	0,98	0,8	0,82	1,05	0,73	0,59	0,3
Proportion between length and width of merus		3,1	3,1	3,7	3,19	3	3,14	3,3	3	3
Length of carpus from articulation to articulation		0,95	0,95	1,42	1,06	1	1,2	0,97	0,72	0,39
Width of carpus		0,53	0,5	0,72	0,61	0,63	0,78	0,57	0,45	0,24
Proportion between length and width of carpus		1,8	1,9	2	1,64	1,6	1,54	1,7	1,6	1,6
Length of propodus		2,14	2	2,9	2,2	2,26	2,72	2,2	1,7	0,94
Width of propodus		0,41	0,4	0,64	0,48	0,5	0,64	0,48	0,37	0,225
Proportion between length and width of propodus		5	5	4,53	4,58	4,52	4,25	4,58	4,6	4,2
Length of dactylus		0,64	0,66	0,96	0,8		0,9			0,3
Length of dorsal hook with regard to the principal one		0,33					0,38			0,43
Thickness of dorsal hook with regard to the principal one		0,3	0,28		0,26		0,3			0,33

N° 1 and N° 2, Cotypes of *Syn. neomeris* (de Man) from the Mergui-Archipelago; N° 3, adult male, long 26,5 mm. and N° 6, ova-bearing female, long 26 mm. from Stat. 99; N° 4, 5, 7, 8 and 9 from Stat. 258.

The eggs are rather numerous, large, 1—1,2 mm. long, 0,72—0,75 mm. broad; those of the Mergui female N° 2 are long 0,8 mm. and 0,55 mm. thick.

† 6. *Synalpheus Gravieri* Cout.

Synalpheus Gravieri H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 870, fig. 2.
Synalpheus Gravieri J. Pearson, On the Macrura, in: Herdman's Report on the Pearl Oyster Fisheries, 1905, p. 82.
Alpheus prolificus A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 484.

Stat. 49. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 6 specimens of different size, one of which with eggs.
Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-Strait. Depth from 69—91 m. Fine grey sand. 3 specimens, one of which with eggs.
Stat. 164. August 20. 1° 42′.5 S., 130° 47′.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 1 specimen.
Stat. 240. November 22—December 1. Banda-anchorage. Lithothamnion-bank in 18—36 m. 2 young specimens.
Stat. 258. December 12/16. Tual-anchorage, Kei-islands. 22 m. Lithothamnion. 19 specimens of different size, many of which with eggs.
Stat. 260. December 16 and 18. 5° 36′.5 S., 132° 55′.2 E. 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 2 egg-bearing females of small size.
Stat. 279. January 11/13. Rumah-Kuda-bay, Roma-island. 36 m. Mud and sand. 1 egg-bearing female.
Stat. 310. February 12. 8° 30′ S., 119° 7′.5 E. 73 m. Sand with few pieces of dead coral. 1 adult egg-bearing female and 1 young specimen.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Lithothamnion. 1 female with eggs.

The numerous specimens, collected by this expedition, are very well in accordance with

COUTIÈRE's description and figures. As well the rostrum as the two orbital spines bear a few fine setae at their tips; the outer margin of the orbital spines appears usually not concave near the tips that usually are turned inward; whereas the rostral point is generally slightly turned upward, the orbital spines project horizontally forward.

The measurements of the telson are for 6 specimens indicated in Table A, they are somewhat variable: in the young specimen N° 5 the two pairs of spinules of the upper surface are situated closer together, in the female N° 6 from Stat. 260, that has a small size, they are farther distant from one another than in the other specimens.

As results from Table B, the proportion between the length of the meri, carpi and propodi of the 3rd and 4th legs appears also liable to variability. The four specimens N° 2—5 from Stat. 258 accord, with regard to these proportions, pretty well with those mentioned by COUTIÈRE, though it ought to be remarked, that, after this author, the meri and propodi of the 4th legs should be of equal length, while in our specimens the propodi are usually a little shorter, sometimes, however, as in N° 3 and in a small, ova-bearing female from Stat. 260, N° 6 of the Table, longer than the meri; different from the other specimens, the propodus of the 3rd pair appears in this female N° 6 hardly shorter than the merus. As regards the proportion between the length and the width of these joints, I wish to remark that in fig. 2*b* of COUTIÈRE's work the propodus appears 7-times as long as broad, while, according to the measurements indicated on Table C, the propodus of the 3rd legs shows in the „Siboga" specimens a somewhat stouter shape, the proportion varying between 5,1 and 5,88, except in the small female from Stat. 260, in which the proportion is indicated by the number 6,6; according to the enlargements of the figures in COUTIÈRE's paper, his specimens of *Syn. Gravieri* seem to have been of a very small size, and the more slender shape of the propodus may probably be explained by that difference of size. The merus of 3rd legs is sometimes furnished with 5 spinules, in the two adult females N° 2 and N° 3 from Stat. 258 with 3, in younger specimens with 2 and in the male N° 4 from this Station there were no spinules at all. The meri of the 4th legs carry one or two spinules.

According to COUTIÈRE the thickness of the dorsal hook of the dactyli should be only one-sixth that of the principal hook; though in our specimens the length of the dorsal hook measures also usually one-third that of the other, the dorsal hook appears comparatively thicker, for its thickness is usually one-third, rarely one-fourth that of the ventral hook. This difference, however, is perhaps also owing to the larger size of the specimens collected by this expedition.

In the original description the proportion between the length and the height of the small chela is said to be 3,75. In the female N° 2 from Stat. 258 this proportion proved to be 3,72, but in the female N° 3 from the same Station 3,44: in both specimens the fingers appear as much shorter than the palm as in Fig. 2*a* of COUTIÈRE's paper. First carpal segment of 2nd legs slender, 6—6,6-times as long as thick at its distal extremity and somewhat longer than the following segments taken together: in the youngest specimens the first segment shows a somewhat less slender form and it appears here not longer than the sum of the following.

In some ova-bearing specimens, as e. g. in N° 3 from Stat. 258 and in the female from Stat. 315 the eggs are of a yellow colour, rather numerous, 0,72—0,76 mm. long and black

eye-spots are not visible. Now it is a remarkable fact that in other specimens, as in the adult female N° 2 from Stat. 258 and in that from Stat. 310, the eggs are much larger, 1—1,1 mm. long and 0,6—0,7 mm. thick, less numerous and large, black eye-spots are well-developed. These females N° 2 and N° 3 from Stat. 258 are, however, adult, of equal size and fully agree with one another. In the female N° 6 from Stat. 260 the ova are few in number, also large, 1 mm. long and provided with black eye-spots, though this specimen is only 10 mm. long. These observations indicate that the eggs are developed at various ages of the individual. The largest specimens are 16 mm. long.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.
Proportion between length of telson and width of the posterior margin	3,17	3,21	3	3,16	3,26	3,3	2,78
Proportion between the greatest width and that of the posterior margin	2,17	2,3	2,1	2,26	2,17	2,1	1,97
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	2,16	2,2	2,16	2,13	2,34	1,93	2,3
Proportion between the distances of the two pairs of spinules from the posterior margin	1,76	1,64	1,66	1,7	1,45	1,84	1,75

Table B,

indicating the proportion between the length of the meri, carpi and propodi of the third and fourth legs.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	according to Coutière.
Merus	of the third legs	2,64	2,87	2,82	3	2,81	2,61	2,81
Carpus	of the third legs	1	1	1	1	1	1	1
Propodus	of the third legs	2,3	2,37	2,43	2,39	2,38	2,58	2,43
Merus	of the fourth legs	2,43	2,46	2,43	2,63	2,65	2,31	2,41
Carpus	of the fourth legs	1	1	1	1	1	1	1
Propodus	of the fourth legs	2,37	2,37	2,48	2,57	2,54	2,61	2,41

Table C.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Length of merus	of the third legs	2,3	2,3	2,2	2,6	1,8	1,54
Width of merus	of the third legs	0,6	0,64	0,7	0,68	0,48	0,387
Proportion	of the third legs	3,83	3,6	3,14	3,82	3,75	4
Length of carpus [1]	of the third legs	0,87	0,8	0,78	0,88	0,64	0,59
Width of carpus	of the third legs	0,39	0,42	0,46	0,45	0,33	0,26
Proportion	of the third legs	2,23	1,9	1,7	2	1,94	2,3
Length of propodus	of the third legs	2	1,9	1,9	2,1	1,52	1,52
Width of propodus	of the third legs	0,34	0,36	0,37	0,4	0,27	0,23
Proportion	of the third legs	5,88	5,3	5,1	5,25	5,63	6,6
Length of dactylus	of the third legs	0,54	0,6	0,62	0,6	0,42	0,36
Length of the dorsal hook with regard to the ventral	of the third legs	0,33	0,31	0,33	0,33	0,4	
Thickness of the dorsal hook with regard to the ventral	of the third legs	0,33	0,26	0,3	0,3	0,33	0,33

1) Measured from articulation to articulation.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Length of merus	of the fourth legs	1,85	1,72	1,7	2	1,38	1,2
Width of merus		0,485	0,52	0,54	0,58	0,39	0,315
Proportion		3,81	3,3	3,15	3,45	3,54	3,8
Length of carpus		0,76	0,7	0,7	0,76	0,52	0,52
Width of carpus		0,345	0,39	0,4	0,4	0,29	0,23
Proportion		2,2	1,8	1,75	1,9	1,8	2,26
Length of propodus		1,8	1,66	1,74	1,95	1,32	1,36
Width of propodus		0,3	0,33	0,36	0,38	0,25	0,2
Proportion		6	5	4,83	5,1	5,3	6,8
Length of dactylus		0,52		0,6	0,62	0,42	0,38
Length of the dorsal hook with regard to the ventral		0,33			0,33	0,38	0,37
Thickness of the dorsal hook with regard to the ventral		0,33	0,3	0,28	0,33	0,3	0,33

N° 1 male, long 13,5 mm. from Stat. 49ª; N° 2 and N° 3, females with eggs, 16 mm. long, from Stat. 258; N° 4 male, long 15,5 mm., and N° 5 young specimen, both from Stat. 258; N° 6 female with large eggs, 10 mm. long, from Stat. 260; N° 7 male from Stat. 258.

Remarks. The examination of two specimens from Kagoshima, Japan, referred by Dr. ORTMANN (l. c.) to *Syn. prolificus* (Sp. Bate), proved them to belong to *Syn. Gravieri*. The proportion between the greatest width of the telson and that of its posterior margin was hardly 2, just as in the male N° 7 from Stat. 258: both in this male and in ORTMANN's specimens the telson appeared a little narrower than in the other specimens collected by the "Siboga".

General distribution: Djibouti (COUTIÈRE); Maldive Archipelago (COUTIÈRE); China Sea (COUTIÈRE); Tokyo Bay and Kagoshima, Japan (ORTMANN).

† 7. *Synalpheus Iphinoë* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 116.

Stat. 49ª. April 14. 8° 23'.5 S., 119° 4'.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 male.
Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-Strait. From 54—90 m. Fine grey sand. 2 males and 1 ova-bearing female.
Stat. 240. November 22 till December 1. Banda-anchorage. Lithothamnion-bank in 18—36 m. 1 male.
Stat. 279. January 11/13. Rumah-Kuda-bay, Roma-island. 36 m. Mud and sand. 1 male.

A new species of small size, belonging to the *Neomeris* group.

The rostrum in the male from Banda, which is regarded as the type, is narrow and reaches to the distal third of the visible part of first antennular article. The conical and acuminate, orbital spines are hardly shorter than the rostrum and diverge slightly outward: the three spines are distinctly curved upward at their tips and are not setiferous. In the male from Ruma-Kuda-bay the three spines reach a little farther forward and the supraorbital spines do not diverge outward, in the male from Stat. 49ª they slightly diverge, but are somewhat shorter with regard to the rostrum than in the type; the males from Madura-bay resemble that from Sapeh-Strait, but the rostrum reaches the end of first antennular article, the ova-bearing female, finally, agrees with the type, but the supraorbital spines are less broad and anteriorly much

narrower, the three spines are moreover more strongly curved upward. These slight differences are, in my opinion, to be regarded as individual. Measured at the upper side, — not along the margins — the visible part of first antennular article appears twice or almost twice as long as the second, which is a little longer than the third and the stylocerite just reaches beyond the first article; in this species the visible part of first article is longer with regard to the second than in *Syn. Gravieri.*

The two spines of the basicerite are turned outward and the upper appears in a lateral view almost half as long as the lower; carpocerite little longer than the antennular peduncle, reaching with scarcely half the length of the third article beyond it. The blade of the scaphocerite just exceeds the second antennular article and the terminal spine that projects by one-third of its length beyond the blade, slightly surpasses the antennular peduncle and is almost as long as the carpocerite; in the ova-bearing, adult female from Stat. 51 it is even just as long, but in this female the blade reaches almost the end of the antennular peduncle.

The external maxillipeds exceed the carpocerite by one-third or two-fifths of their terminal joint.

Telson shorter with regard to the width of the posterior margin than that of *Syn. Gravieri*, the telson being 2,7—2,75-times as long as that margin is broad, in the specimen from Stat. 279 this number is even 2,44; outer angles of the posterior margin acute, though not prominent, the margin itself prominent in the middle as in *Syn. Gravieri.* Spinules of the upper surface 0,14—0,16 mm. long, anterior pair situated just in front of the middle, posterior pair one and a half, in the male from Sapeh-Strait even more than twice as far distant from the posterior margin as from the anterior pair.

Upper margin of brachium of large cheliped with a small, curved spine at the apex, chela, as in *Syn. Gravieri*, with a spinous process at the distal end of the palm, but the fingers are a little longer. Small chela also as in *Syn. Gravieri*, the measurements and proportions are indicated in the Table.

Carpus of second legs as in this species, first segment slender, 6-times as long as thick distally and distinctly longer than the following segments taken together.

As regards the legs of the third and fourth pair, I refer to the Table, but I wish to remark the following. In both legs the merus is 4-times as long as broad; along the middle of the merus of the third legs are inserted four or five small spinules, from 0,04 to 0,14 mm. long, whereas one observes two or three similar spinules on the merus of the fourth pair. Propodus as in *Syn. Gravieri*, but, like the merus, usually a little more slender. Dactylus about one-fourth the propodus, broad at its base, its width being here just half as long as the straight distance between the tip of the ventral hook and the proximal end of the anterior margin. Ventral hook perpendicular to the posterior border, 3-times as long as broad near the insertion of the dorsal hook and slightly tortuous; dorsal hook much shorter and narrower than the other, its length one-third that of the ventral hook, which at its base appears somewhat more than 3-times as thick as the dorsal hook.

Ova comparatively large, 0,75 mm. long.

The male from Banda is 12 mm. long, the ova-bearing female from Stat. 51 12,5 mm.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.
Proportion between length of telson and that of the posterior margin	2,7	2,75	2,75	2,44
Proportion between the greatest width and that of the posterior margin	2,05	2	2,06	1,95
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,81	1,8	1,86	1,81
Proportion between the distances of the two pairs of spinules from the posterior margin	1,45	1,65	1,66	1,6

N° 1 male from Stat. 49[a]; N° 2 male from Stat. 51; N° 3 male from Banda; N° 4 male from Stat. 279.

Table B.

	N° 1.	N° 2.	N° 3.
Length of small chela	2,24	2,25	2,24
Height of the palm	0,66	0,73	0,67
Proportion between length and height	3,4	3,1	3,34
Length of the fingers	1	0,92	0,94
Proportion between length of chela and that of the fingers	2,24	2,44	2,4
Proportion between length and height of the palm	1,88	1,82	1,94

N° 1 male from Stat. 49[a]; N° 2 adult female from Stat. 51; N° 3 male from Banda.

Table C,

indicating the proportion between the length of the meri, carpi and propodi of the 3rd and 4th legs.

		N° 1.	N° 2.	N° 3.
Merus	of 3rd legs	3	3	2,86
Carpus	of 3rd legs	1	1	1
Propodus	of 3rd legs	2,6	2,54	2,46
Merus	of 4th legs	2,5	2,58	2,5
Carpus	of 4th legs	1	1	1
Propodus	of 4th legs	2,31	2,41	2,42

Table D.

		N° 1.	N° 2.	N° 3.
Length of merus	of the third legs	2	2	2,12
Width of merus	of the third legs	0,51	0,5	0,525
Proportion between length and width of merus	of the third legs	4	4	4
Length of carpus from articulation to articulation	of the third legs	0,66	0,67	0,74
Width of carpus	of the third legs	0,3	0,31	0,33
Proportion between length and width of carpus	of the third legs	2,2	2,1	2,24
Length of propodus	of the third legs	1,72	1,7	1,82
Width of propodus	of the third legs	0,25	0,268	0,29
Proportion between length and width of propodus	of the third legs	7	6,3	6,3
Length of dactylus	of the third legs	0,4	0,44	0,46

		N° 1.	N° 2.	N° 3.
Length of merus	of the fourth legs	1,6	1,55	1,65
Width of merus		0,39	0,4	0,41
Proportion between length and width of merus		4,1	3,875	4
Length of carpus from articulation to articulation		0,64	0,6	0,66
Width of carpus		0,28	0,285	0,29
Proportion between length and width of carpus		2,3	2,1	2,28
Length of propodus		1,48	1,45	1,6
Width of propodus		0,23	0,25	0,26
Proportion between length and width of propodus		6,4	5,8	6,1
Length of dactylus		0,4	0,42	0,46

Table C and Table D: N° 1 male from Stat. 49ª; N° 2 male from Stat. 51; N° 3 male from Banda.

† 8. *Synalpheus jedanensis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 117.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands (Pearl-banks). 13 m. Sand and shells. 3 males and 3 ova-bearing females.

Another new form of the *Neomeris* group, approaching to *Syn. Gravieri* and *Syn. Iphinoë*, but distinguished by the stouter shape of the small chela and of the four posterior legs.

In one of the male specimens the rostrum is narrow, 3-times as long as wide at its base and reaching to the distal fourth of the visible part of first antennular article; it appears distinctly longer than the supraorbital spines which are also narrow, though at their base broader than the rostrum. The tips of the three frontal spines are setose, slightly curved upward and project almost straight forward. In another male and in an adult female the rostrum reaches almost to the end of first article, in another female, on the contrary, it extends to the distal third only, while in the second male the supraorbital spines are very slightly converging. The visible part of first antennular article is usually a little more than one and a half as long as the second, in the ova-bearing female it is almost twice as long, the proportion being as 9 : 5; third article as long or hardly shorter than second. The stylocerite reaches to the 2nd third or fourth part of second antennular article.

Lower spine of basicerite curved outward, slightly shorter than the stylocerite; upper spine turned upward, hardly half as long as the lower. Carpocerite very little longer than the antennular peduncle, reaching only by one-third or one-fourth the third article beyond it; blade extending to the middle of third article, terminal spine of the scaphocerite as long as the antennular peduncle, in one female even as long as the carpocerite.

The telson resembles that of *Syn. Iphinoë*, the outer angles of the posterior margin which is rather prominent in the middle, are spiniform though measuring hardly one-third the length of the adjacent, short, external spinules. Spinules of the upper surface large, 0,15—0,19 mm. long, anterior pair situated just in front of the middle, but the distance between the two pairs with regard to their distance from the posterior margin appears rather variable (vide the measurements).

External maxillipeds extending by two-fifths of their terminal joint beyond the carpocerite.

The large chela resembles that of *Syn. Iphinoë*, distal extremity of the palm with a spine which is curved downward, upper margin of brachium ending in a small acute tooth. The small chela agrees also with that of *Syn. Iphinoë*, as regards the length of the fingers but, the height being much larger, the chela presents a much stouter shape. While in *Syn. Iphinoë* the chela is more than 3-times and the palm almost twice as long as high, in *Syn. jedanensis* the palm is only one and a half, the chela 2,61—2,73-times as long as high.

First carpal segment of 2nd legs of a stouter form than in *Syn. Iphinoë*, the proportion between length and thickness varying from 3,8 to 4,8; following segments taken together slightly longer or but a trifle shorter than the first segment.

As regards the proportion between the length of the merus, the carpus and the propodus of 3rd and 4th legs, this species accords with *Syn. Iphinoë*, but all these joints show a stouter shape, as is proved by the measurements. The merus of 3rd legs is armed with five spinules which are 0,06—0,16 mm. long, that of 4th legs with three or four. Dactyli nearly as in *Syn. Iphinoë*, but those of the 3rd pair a little less broad or thick at base: so, in the 3rd legs, the proportion between the length of the dactylus, i. e. the straight distance between its tip and the proximal end of its anterior margin, and the width near the articulation varies from 2,45 to 2,5, whereas it is 2,1—2,21 in *Syn. Iphinoë*. These dactyli measure about one-fourth the length of the propodus, the dorsal hook is almost half as long as the other, which is 3-times, in one female even twice as thick as the dorsal hook.

The dactyli of 4th legs measure one-third the length of the propodus or somewhat less and their thickness near the articulation is about $^3/_7$ their length; the dorsal hook is almost half as long as the ventral which is a little more than twice to three times as thick as the dorsal hook.

Eggs large, not numerous; those of a female long 15 mm., are 1,1—1,2 mm. long, ochraceous, without eye-spots, those of another female of the same size are 1,5 mm. long, greyish and black eye-spots are already observed.

Table A.

	N° 1.	N° 2.	N° 3.
Proportion between length of telson and that of the posterior margin . . .	2,54	2,57	2,55
Proportion between the greatest width and that of the posterior margin . .	2	2	1,94
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,84	1,73	1,91
Proportion between the distances of the two pairs of spinules from the posterior margin	1,91	1,53	1,71

Table B.

	N° 1.	N° 2.	N° 3.
Length of the small chela.	2,25	2,25	2,65
Height of the palm	0,83	0,86	0,97
Proportion length and height of this chela.	2,71	2,61	2,73
Length of the fingers	1	0,9	1,16
Proportion between the length of the chela and that of the fingers. . . .	2,25	2,5	2,28
Proportion between length and height of the palm.	1,5	1,57	1,54

Table C,

indicating the proportion between the length of the meri, carpi and propodi of the 3rd and 4th legs.

		N° 1.	N° 2.	N° 3.
Merus	of 3rd legs	2,93	2,84	3
Carpus	of 3rd legs	1	1	1
Propodus	of 3rd legs	2,28	2,45	2,4
Merus	of 4th legs	2,6	2,57	2,44
Carpus	of 4th legs	1	1	1
Propodus	of 4th legs	2,18	2,28	2,1

Table D.

		N° 1.	N° 2.	N° 3.
Length of the merus	of the third legs	2,05	2,16	2,3
Width of the merus	of the third legs	0,555	0,63	0,65
Proportion between length and width of the merus	of the third legs	3,7	3,43	3,54
Length of the carpus from articulation to articulation	of the third legs	0,7	0,76	0,78
Width of the carpus	of the third legs	0,33	0,42	0,39
Proportion between length and width of the carpus	of the third legs	2,1	1,8	2
Length of the propodus	of the third legs	1,6	1,86	1,86
Width of the propodus	of the third legs	0,3	0,37	0,335
Proportion between length and width of the propodus	of the third legs	5,33	5	5,55
Length of the dactylus	of the third legs	0,43	0,6	0,48
Length of the merus	of the fourth legs	1,6	1,8	1,76
Width of the merus	of the fourth legs	0,44	0,53	0,48
Proportion between length and width of the merus	of the fourth legs	3,64	3,4	3,66
Length of the carpus from articulation to articulation	of the fourth legs	0,62	0,7	0,72
Width of the carpus	of the fourth legs	0,29	0,35	0,33
Proportion between length and width of the carpus	of the fourth legs	2,1	2	2,2
Length of the propodus	of the fourth legs	1,35	1,6	1,52
Width of the propodus	of the fourth legs	0,255	0,335	0,29
Proportion between the length and width of the propodus	of the fourth legs	5,3	4,8	5,24
Length of the dactylus	of the fourth legs	0,46	0,5	0,44

N° 1 a male, N° 2 and N° 3 females.

† 9. *Synalpheus miscellaneus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 118.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 male.

A new species of the *Neomeris* group presenting characters both of *Syn. neomeris* and of *Syn. jedanensis* and therefore bearing the name of "*miscellaneus*". Frontal spines with the subacute tips setose and very slightly turned upward. The rostrum which is 2,5-times as long as broad at its base, reaches a little beyond the middle of the visible part of first antennular article, lateral spines slightly shorter than the rostrum, with the tips somewhat turned inward;

the interspaces between the rostrum and the supraorbital spines show nearly the reverse shape of these spines, which are hardly longer than broad at their base, convex above, and resembling those of *Syn. neomeris.*

Second article of the rather slender, antennular peduncle one and a half as long as broad at the distal end, measuring two-thirds the length of the visible part of the first article, third article a little shorter than second; stylocerite as long as basal article, not reaching beyond it.

Lower spine of basicerite a little shorter than the stylocerite, with the tip slightly turned outward; upper spine half as long as the lower, directed obliquely upward; the carpocerite, that is 3,7-times as long as thick, surpasses the antennular peduncle by one-third of the third article. The lateral spine of the scaphocerite, the outer margin of which is straight, is a little shorter than the antennular peduncle; this spine is not curved inward and surpasses the rather narrow blade by one-fifth of its length and the blade reaches the middle of third antennular article.

In *Syn. neomeris* the carpocerite is longer, the stylocerite reaches to the middle of second antennular article, the lower spine of the basicerite is but a little shorter than the stylocerite and the upper spine measures only one-third of the lower.

Telson much shorter with regard to its width than that of *Syn. neomeris,* the proportion between its length and the width of the posterior margin being 2,35; posterior margin moderately prominent, the outer angles spiniform, though short, reaching only the middle of the short spinules near them; proportion between the greatest width and that of the posterior margin 1,77. The spinules of the upper surface which are 0,17 mm. long and situated not far from the lateral margins, are inserted far backward and the two pairs are as much approximate as in *Syn. neomeris.* The proportion between the distance of the anterior pair from the posterior margin and the length of the telson is namely 3 and the proportion between the distances of both pairs from the posterior margin is 1,47. (Confer in the Table A of *Syn. neomeris* N° 5 and N° 6, p. 215).

Brachium of large cheliped 2,3-times as long as broad, presenting a less stout shape than in *Syn. neomeris*, upper margin obtuse at apex; lower angle of the carpus produced into a long, spiniform tooth, chela nearly as in *Syn. neomeris*, anterior margin of the palm with a short, acute tooth which is curved downward. Brachium of small cheliped resembling that of the large. The small chela resembles that of *Syn. jedanensis*: proportion between its length and height 2,7, proportion between the total length of the chela and that of the fingers 2,336 and proportion between the length and the height of the palm 1,54. The small chela of *Syn. neomeris* has a more slender form and the fingers are longer.

Second legs as in *Syn. neomeris.* Merus slender, 7,1-times as long as thick, first segment of the carpus 6-times as long as thick, slightly longer than the sum of the following.

The proportions of the third pair of feet are: merus 2,72; carpus 1; propodus 2,1. The merus, 3,78-times as long as wide, is armed, near the distal third of the posterior margin, with one single small spinule, 0,14 mm. long, of a rather stout form; carpus 1,96-times, propodus just 5-times as long as wide. While in *Syn. jedanensis* the propodus of the third legs carries eight spinules, one observes only four spinules, long 0,16—0,2 mm. in this new species,

besides those at the distal extremity. The dactyli very much resemble those of *Syn. neomeris*; they measure a little less than one-third the length of the propodus, viz. $^4/_{13}$ and they are just 2,5-times as long as broad near the articulation; the acuminate ventral hook, which measures almost half the length of the joint and which is 3-times as long as broad at its base, is obliquely directed forward like in *Syn. neomeris*; the length of the dorsal hook is one-third that of the other, which is 3-times as thick at its base as the former.

The proportions of the fourth pair are: merus 2,32; carpus 1; propodus 2,1. Merus 3,27-times longer than wide, with one spinule, long 0,1 mm., of a stout shape just beyond the middle; carpus twice, propodus 5-times as long as broad, the propodus also with four spinules long 0,11—0,16 mm., besides those at the distal extremity. Dactylus just one-third the length of the propodus, 2,4-times as long as wide near the articulation, for the rest fully resembling that of the third pair. The third and the fourth legs are moderately setose.

Length of the single specimen 16,5 mm.

† 10. *Synalpheus streptodactylus* Cout.

Synalpheus neomeris var. *streptodactylus* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 870, Pl. LXX, fig. 1'.
Alpheus neomeris J. G. de Man, in: Zoolog. Jahrb. Abth. f. Syst. IX, 1897, p. 734 (partim).
Alpheus neomeris J. G. de Man, in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 891.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 22 m. and less. Mud, coral and coralsand. 1 ova-bearing female.
Stat. 43. April 4/5. Anchorage off Pulu Sarassa, Postillon-islands. Depth up to 36 m. Coral. 1 ova-bearing female.
Stat. 50. April 16/18. Bay of Badjo, West coast of Flores. Depth up to 40 m. Mud, sand and shells, according to locality. 1 very young specimen.
Stat. 65a. May 6. Near Tanah Djampeah. From 400 m. upward to 120 m. Pale, grey mud, changing during haul into coral bottom. 1 specimen.
Stat. 71. May. Pulu Barang near Makassar. Reef. 1 ova-bearing female.
Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. 36 m. Coralreef. 1 ova-bearing female.
Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar-) island. Reef. 1 ova-bearing female.
Stat. 164. August. 20. 1° 42'.5 S., 130° 47'.5 E. Between Misool and New-Guinea. 32 m. Sand, small stones and shells. 1 ova-bearing female.
Stat. 213. September 26—October 26. Saleyer-anchorage and Surroundings. Coralreefs. From 9—36 m. Mud and mud with sand. 1 young specimen.
Stat. 240. November 22 till December 1. Banda-anchorage. From 9—36 m. Lithothamnion-bank. 1 ova-bearing female.
Stat. 258. December 12/16. Tual-anchorage, Kei-islands. 22 m. Lithothamnion, sand and coral. 4 specimens of small size, the largest of which with eggs.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 18 specimens, several of which with eggs.
Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 ova-bearing female.
Stat. 310. February 12. 8° 30' S., 119° 7'.5 E. Between Sumbawa and Flores. 73 m. Sand with few pieces of dead coral. 2 ova-bearing females, one of which bears a Bopyrid in the cephalothorax, and 1 young specimen.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 3 young specimens.

In my work on the Decapoda collected by Captain STORM (l. c. 1897) nine specimens of small size, one of which was provided with eggs, from Atjeh, were wrongly referred by me to *Syn. neomeris* (de Man). At that time I still supposed that the quite different shape of the dactyli of the 3rd and 4th legs was due to their younger age: this mistake should not have been committed, when Professor COUTIÈRE's researches had then already been published. (Confer p. 213).

Syn. neomeris (de Man) is in reality a quite different species, its telson is much more elongate and the anterior pair of spinules are situated always posterior to the middle; the second antennular article is somewhat longer with regard to the visible part of the first, the third and the fourth legs show a much stouter shape, the propodi are always considerably shorter than the meri and the shape of the dactyli is quite different; the small chela has a more slender form, the fingers are longer and this species attains a much larger size than *Syn. streptodactylus*.

Through the courtesy of Professor COUTIÈRE I was able to study four specimens, two of which with eggs, from the Maldive Archipelago, which in the quoted paper he has referred to *Syn. neomeris*: these specimens, however, proved to belong to the variety *streptodactylus* of this author and not at all to the true *Syn. neomeris* (de Man). These specimens also agree with one of the nine from Atjeh, which I have referred to *Syn. neomeris* in 1897: this fact was already suggested by COUTIÈRE in his work on the Alpheidae of the Maldive and Laccadive Archipelagoes, 1905, p. 870.

The size of the ova-bearing females is variable. So e. g. the female from Banda is 10 mm. long, its eggs 0,78 mm. long; in the female from Stat. 282, that has the same size, the ova are smaller, ochraceous, 0,6—0,62 mm. long, the female from Stat. 310, which is infested by a Bopyrid, is 14,5 mm. long, while the ova on which one observes two black eye-spots, are 1 mm. long; in the largest of all the specimens, the female almost 18 mm. long from Stat. 144, the eggs are rather numerous and 0,78 mm. long, as long as those of the much smaller female from Banda.

The numerous specimens collected by the "Siboga" show slight differences with regard to the antennal and antennular peduncles; these ought to be described and I wish to compare them with figure 61 of my quoted paper of 1897: this figure represents a female of *Syn. streptodactylus* from Atjeh.

The ova-bearing female from Stat. 33 is 13,5 mm. long; it accords with the cited Fig. 61, but the stylocerite hardly extends beyond the first antennular article and the carpocerite is shorter, though still surpassing the antennular peduncle; terminal spine of scaphocerite as long as the carpocerite. The young specimens from the three following Stations agree with this female, but in the specimen from Stat. 65a the supraorbital spines project straight forward. The female from Stat. 71 agrees with the quoted figure, but, the carpocerite being also a little shorter, the terminal spine of the scaphocerite extends much beyond it. This is also the case in the female long 10,5 mm. from Stat. 86, in which the carpocerite is hardly longer than the antennular peduncle; the stylocerite reaches almost the middle of the second article and the three frontal spines are a little longer, while the supraorbital spines project straight forward; the lower spine of the basicerite appears a little shorter than the first antennular article. The

large female from Stat. 144 accords with the figure, but the carpocerite hardly extends beyond the antennular peduncle and the terminal spine of the scaphocerite extends as far forward as that peduncle; the frontal spines are a little shorter and directed straight downward. The specimen from Stat. 164 is mutilated, like that from Stat. 213 in which the rostrum and the left supraorbital spine are missing; the terminal spine of the scaphocerite just reaches beyond the carpocerite, which is hardly longer than the antennular peduncle. The small specimen from Banda accords with the figure, but in that from Stat. 258 the supraorbital spines are hardly shorter than the rostrum and the three frontal spines, slightly longer than in the figure, project straight forward; the carpocerite, as long as the terminal spine of the scaphocerite, appears again a little shorter than in the figure. The specimens taken at the Stat. 273 agree with the figure, but the stylocerite reaches to or just beyond the middle of the second article and both the carpocerite and the terminal spine are a little shorter. Sometimes in these specimens from the Jedan Islands the supraorbital spines project straight forward. The female from Stat. 282 agrees with the figure, but the supraorbital spines are almost as long as the rostrum and the stylocerite reaches to the middle of second article. The two ova-bearing females from Stat. 310 are of medium size, 13 mm. long, the rostrum extends to the end of first antennular article and appears much longer than the supraorbital spines; the stylocerite reaches just beyond the middle of second article and the blade of the scaphocerite to the end of the antennular peduncle. In the young specimens, finally, from Stat. 315 the stylocerite reaches to the middle of second article, while the carpocerite and the terminal spine of the antennal scale are hardly longer than the antennular peduncle.

The large chela much resembles that of *Syn. neomeris* (J. G. de Man, l. c. 1897, fig. 61 *a*), but it has a somewhat more slender shape, the small chela, however, differs by the fingers being constantly shorter than the palm: the palm being one and a half as long as the fingers or nearly so.

In the first carpal segment of the second legs the proportion between its length and thickness is somewhat variable, this proportion varying between 5 and 5,65; the sum of the following segments is a little shorter than the first. In younger specimens the carpus has a somewhat stouter shape, the proportion between length and thickness of the first segment being then 4,84 (Stat. 258), 4,73 (Stat. 164), 4,6 (Stat. 273), 4,44 (Stat. 240) and even 4,3 (Stat. 213), and in very young individuals as in those from the Stations 240, 213 and 50 the first segment appears a little shorter than the sum of the following. In the youngest of all the specimens, that from Stat. 50, the first carpal segment is only 4-times as long as thick. The large, full-grown, ova-bearing female from Stat. 144 makes a remarkable exception, for the first segment of the carpus has also a stout shape (proportion 4,33) and appears one-fifth shorter than the sum of the following.

As results from the Tables of measurements, the proportions between the length of the joints of the following legs are somewhat variable, like also the proportion between length and width of the joints; the joints appear the more slender, the more younger the specimens are.

The meri of the third legs carry 3—5 spinules, long 0,08—0,13 mm., those of the fourth 2 or 3, rarely 1. Very characteristic are the dactyli. Those of the third pair, that measure

two-sevenths or a little more than one-fourth of the propodus, are 3-times as long as broad at their base, — the length of the dactyli being the straight distance between the tip of the ventral hook and the proximal end of their anterior margin —, as well in the specimens from Stat. 273 as in those from Atjeh and from the Maldive Archipelago; sometimes as in the specimen taken at Stat. 33 the proportion between length and width becomes 2,8 and in the adult female from Stat. 144 the dactyli are comparatively broader at their base, the proportion between length and width being here 2,5. According to COUTIÈRE (l. c. 1905), in that species which was regarded by him as the true *Syn. neomeris*, the thickness of the dorsal hook should be no more than one-third that of the ventral and the former should be half as long as the latter; in the variety *streptodactylus* the dorsal hook should measure at least two-thirds the length of the ventral, which should be only twice as thick as the dorsal hook. All the specimens collected by the "Siboga" now present the characters of this variety *streptodactylus*, but the ventral hook shows a stouter shape than in Fig. 1′ of COUTIÈRE's paper: in the "Siboga" specimens the conical ventral hook is namely 2,5-times, in the adult female from Stat. 144 even only twice as long as thick at its base, but in Fig. 1′ it appears 3,6-times as long as thick. The ventral hook, in the "Siboga" specimens, agrees with Fig. 1, but this figure is probably inaccurate, for the ventral hook appears here only twice as thick at its base as the other, whereas, after the description, it should be 3-times as thick as the dorsal hook. I wish to add that the specimens from the Maldive Archipelago, kindly sent me by COUTIÈRE, fully accord with those collected by the "Siboga" as regards the shape of these dactyli, the ventral hook, however, appears comparatively a little less thick, though being not yet 3-times as long as thick.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Proportion between length of telson and width of posterior margin .	2,58	2,7	2,72	2,81	2,93	2,6
Proportion between the greatest width and that of posterior margin .	1,9	2,08	2	2,1	2,1	2
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,97	1,87	1,68	1,8	1,81	1,9
Proportion between the distances of the two pairs of spinules from the posterior margin	1,8	1,64	1,53	1,61	1,74	1,75

N° 1 female with eggs from the Maldive Archipelago; N° 2 specimen from Atjeh, described by me in 1897 as *Alpheus neomeris*. (Private Collection); N° 3 adult egg-bearing female from Stat. 144; N° 4 female with eggs from Stat. 273; N° 5 female with eggs from Stat. 310; N° 6 young specimen from Stat. 315.

Table B,

indicating the proportion between the length of the meri, carpi and propodi of the third and fourth legs.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.
Merus	of the third legs	2,73	2,61	2,66	2,6	2,7	2,52	2,55	2,6	2,7
Carpus	of the third legs	1	1	1	1	1	1	1	1	1
Propodus	of the third legs	2,69	2,65	2,3	2,4	2,8	2,55	2,61	2,4	2,6
Merus	of the fourth legs	2,6	2,54	2,56	2,34	2,33	2,2	2,26	2,35	2,4
Carpus	of the fourth legs	1	1	1	1	1	1	1	1	1
Propodus	of the fourth legs	2,71	2,87	2,33	2,37	2,6	2,47	2,44	2,35	2,5

Table C.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.
Length of merus	of the third legs	1,75	1,72	2,4	1,85	1,35	1,84	1,76	1,95	1,64
Width of merus		0,465	0,455	0,66	0,48	0,325	0,455	0,42	0,52	0,4
Proportion between length and width of merus		3,76	3,74	3,64	3,85	4,14	4	4,2	3,75	4,1
Length of carpus from articulation to articulation		0,64	0,66	0,9	0,71	0,5	0,73	0,69	0,75	0,6
Width of carpus		0,29	0,3	0,46	0,325	0,23	0,32	0,3	0,34	0,28
Proportion between length and width of carpus		2,2	2,2	1,94	2,2	2,2	2,3	2,3	2,2	2,1
Length of propodus		1,72	1,75	2,06	1,7	1,4	1,86	1,8	1,8	1,56
Width of propodus		0,25	0,25	0,37	0,28	0,195	0,275	0,26	0,31	0,24
Proportion between length and width of propodus		7	7	5,57	6,1	7,2	6,8	7	5,8	6,5
Length of dactylus		0,48	0,51	0,52	0,51	0,41	0,54	0,5	0,46	0,45
Breadth of dactylus		0,16	0,18	0,213	0,17	0,135	0,175	0,16	0,18	0,17
Length of merus	of the fourth legs	1,45	1,4	2	1,5	1,12	1,5	1,45	1,6	1,3
Width of merus		0,36	0,345	0,545	0,375	0,273	0,37	0,333	0,42	0,32
Proportion between length and width of merus		4	4	3,67	4	4,1	4	4,35	3,8	4
Length of carpus from articulation to articulation		0,56	0,55	0,78	0,64	0,48	0,68	0,64	0,68	0,54
Width of carpus		0,255	0,26	0,41	0,285	0,23	0,29	0,27	0,31	0,25
Proportion between length and width of carpus		2,2	2,1	1,9	2,2	2,1	2,34	2,3	2,2	2,2
Length of propodus		1,52	1,58	1,82	1,52	1,25	1,68	1,56	1,6	1,36
Width of propodus		0,225	0,23	0,33	0,255	0,185	0,25	0,233	0,28	0,215
Proportion between length and width of propodus		6,75	6,87	5,51	6	6,7	6,72	6,7	5,7	6,3
Length of dactylus		0,47	0,48	0,5	0,47	0,38	0,5	0,46	0,44	0,41
Breadth of dactylus		0,16	0,17	0,2	0,16	0,12	0,17	0,16	0,17	0,14

In the Tables B and C: N° 1 female with eggs from the Maldive Archipelago; N° 2 specimen from Atjeh (Private Collection); N° 3 adult female from Stat. 144; N° 4 female from Stat. 164; N° 5 specimen from Stat. 213; N° 6 and N° 7, specimens from Stat. 273; N° 8 female from Stat. 310; N° 9 young specimen from Stat. 315.

Table D.

	N° 1.	N° 2.	N° 3.	N° 4.
Length of the small chela	2,1	3	2,22	2,15
Height of the small chela	0,7	1,02	0,7	0,74
Proportion between length and height of this chela	3	3	3,2	2,9
Length of the fingers	0,88	1,2	0,92	0,96
Proportion between length of chela and that of the fingers	2,4	2,5	2,4	2,2
Proportion between length and height of the palm	1,74	1,8	1,85	1,61

N° 1 female with eggs from the Maldive Archipelago; N° 2 adult female from Stat. 144; N° 3 female from Stat. 273; N° 4 ova-bearing female from Stat. 310.

General distribution: Maldive Archipelago (Coutière); Atjeh (de Man); Ternate (de Man).

† 11. *Synalpheus streptodactyloides* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 114.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 female without eggs.

A new form of the *Neomeris* group, closely related to *Syn. streptodactylus* Cout.

In *Syn. neomeris* (de Man), *Syn. streptodactylus* Cout., *Syn. Gravieri* Cout. and still other species the rostrum is separated posteriorly from the supraorbital spines by the concave, anterior wall of the front, the anterior margin of which is distinctly visible at either side beneath the rostrum, when the carapace is looked at from above. In this new species the rostrum is comparatively broader than in *Syn. streptodactylus,* being 2,2-times as long as broad at its base, in *Syn. streptodactylus* 2,75—3,25, usually 3-times; it extends to the distal sixth of the visible part of first antennular article and the tip is hardly turned upward; the supraorbital spines, distinctly shorter than the rostrum and hardly reaching beyond the middle of the first article, are slightly directed downward and make acute angles with the rostrum, at least the left spine, for the right is much shorter and apparently mutilated, while the anterior wall of the front is not visible at all; the acute tip of the supraorbital spines is glabrous, like the rostrum, and very slightly turned outward.

Second antennular article a little more than two-thirds as long as the first and almost one and a half as long as thick; stylocerite reaching to the 2nd fourth or fifth of median article. The carpocerite extends by two-thirds the length of the third article beyond the tip of the antennular peduncle; terminal spine of scaphocerite hardly longer than the antennular peduncle, distinctly shorter than the carpocerite; blade reaching the middle of third antennular article, lower spine of basicerite as long as the stylocerite and projecting straight forward, upper spine small, measuring, in a lateral aspect, one-fourth of the lower.

Telson 2,53-times as long as the posterior margin is broad, the latter as in *Syn. streptodactylus*, with the outer angles acute, though not prominent; greatest width twice as long as the posterior margin. Spinules of upper surface 0,07—0,08 mm. long, much smaller than those of *Syn. streptodactylus* and situated close to the lateral margins; while in *Syn. streptodactylus* the anterior pair is always situated before the middle, it is in this species situated posterior to the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 2,19. The proportion between the distances of the two pairs from the posterior margin is indicated by the number 1,7.

In both chelipeds the upper margin of the brachium ends in a minute, acute tooth; fingers of the large chela a little longer than those of *Syn. streptodactylus.* Small chela as in this species, fingers 1 mm. long, total length 2,3 mm., height 0,76 mm., proportion between the total length and the height 3, proportion between the length and the height of the palm 1,71.

First segment of the carpus stout, 4-times as long at thick distally, slightly shorter than the following segments taken together.

The relative measurements of the third legs are: carpus 1; merus 2,44; propodus 2,125. The merus, just as long as the carpus of the second legs, is 3,68-times as long as wide and bears, a little beyond the middle, a single spinule long 0,09 mm. The carpus, measured from articulation to articulation, appears to be 2,5-times longer than wide and presents a more slender form than in *Syn. streptodactylus.* The propodus is 5,66-times longer than wide, with 8 spinules long 0,09—0,1 mm. on the posterior margin, besides those at the distal extremity. Dactylus (0,39 mm.) half as long as the carpus and almost one-fourth of the propodus (1,7 mm.),

of a stouter shape than in *Syn. streptodactylus*, the proportion between length and width being 2,51; for the rest it much resembles that of this species. The ventral hook is almost twice as long as broad at its base, the proportion being as 15 : 8: the dorsal hook is just half as broad at its base as the other, hardly shorter, the proportion being as 15 : 14, and it makes an acute angle with the ventral hook; as in *Syn. streptodactylus* both hooks are slightly diverging.

Relative measurements of the fourth legs: carpus 1; merus 2,15; propodus 2,11. The merus is 3,52-times longer than wide, with one very small spinule, long 0,06 mm., nearly in the middle; carpus, as in the third legs, 2,5-times as long as wide; propodus 5,43-times as long as wide, bearing 7 spinules long 0,07—0,08 mm., besides those at the distal extremity. Dactylus 0,38 mm. long, just one-fourth the length of the propodus, a little more than half as long as the carpus and resembling that of the third legs; proportion between length and width 2,7; ventral hook twice as long as thick at its base, the proportion being as 16 : 7, dorsal hook a little more than half as broad at its base, the proportion being as 4,3 : 7, and hardly shorter, the proportion between the length of both hooks being as 16 : 15. The anterior margin of the dactylus is slightly sinuate, like that of the third legs, but it is not so regularly arcuate as in *Syn. streptodactylus*.

The third and the fourth legs are, in both species, equally setose.

Length 11,5 mm.

† 12. *Synalpheus modestus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 115.

Stat. 240. November 22 till December 1. Banda. Reef. 1 specimen, probably a male.

A new species of the *Neomeris* group, closely related to *Syn. streptodactylus* Cout.

The rostrum of this specimen which is 11 m. long, is slender, five times as long as wide at its base and it reaches just beyond the middle of median antennular article; the frontal spines, spiniform and acuminate like the rostrum, are directed straight forward or perhaps a little inward and are much shorter than the rostrum, for they only reach to the distal fourth of the visible part of first antennular article. The rostrum is slightly curved upward at the tip and, in a lateral view, appears to be situated at a somewhat lower level than the lateral spines.

Telson 2,375-times as long as the posterior margin is broad, proportion between the greatest width and that of the posterior margin 1,77; outer angles of the latter acute, spiniform, though much shorter than the rounded, median part of the margin. The spinules of the anterior pair on the upper surface are 0,13 mm. long, those of the posterior pair 0,146 mm., and they are situated as in *Syn. streptodactylus*, though much closer to the lateral margins; as in this species, the anterior pair is placed before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,84 and the proportion between the distances of both pairs from the posterior margin is 1,48. The telson of *Syn. streptodactylus* is always somewhat longer with regard to the width of the posterior margin and the spinules of the upper surface are somewhat farther distant from the lateral margins.

Second antennular article a little longer than wide, its length being about two-thirds that of the visible part of basal article, the third a little shorter than the second. Stylocerite spiniform, acuminate, reaching to the distal third of median article.

Carpocerite of a stouter shape than that of *Syn. streptodactylus*, 3,35-times longer than wide (that of *Syn. streptodactylus* 4,1-times), extending beyond the antennular peduncle by half the distal article; lateral spine of the basicerite a little shorter than the stylocerite, reaching to the 2nd third part of median antennular article; upper spine directed outward, reaching about to the middle of basal article. Terminal spine of scaphocerite slightly curved inward, just reaching beyond the carpocerite and projecting by one-third of its length beyond the blade, which is rather broad and extends to just beyond the middle of third antennular article.

Merus of large cheliped 2,18-times as long as wide, the slightly arcuate, upper margin ending in an acute spiniform tooth. The relative measurements of the large chela, taken along the infero-external side, are the following: fingers 1, total length 4, height 1,5. The anterior margin of the palm carries, on the supero-internal side, an acute, spiniform tooth. Extremities of the fingers blue, with yellow tips. Merus of small cheliped 2,4-times as long as wide, upper margin with a spiniform tooth at the apex. Relative dimensions of the small chela: fingers 1; total length 3,1; height 1,1 and this chela is 2,82-times as long as high.

Merus of second legs 6-times as long as wide; first article of the carpus 4,64-times as long as thick, nearly as long as the chela, the fingers of which are slightly longer than the palm, but distinctly shorter than the sum of the four following articles, the proportion between the length of the first article and the sum of the following being 1,26; the 2nd, 3rd and 4th articles are of equal length.

Relative dimensions of third legs: merus 2,61; carpus 1; propodus 2,72. The distal half of the merus, which is just 4-times as long as wide, is armed with 4 movable spinules of unequal length, the largest of which is 0,16 mm. long. The propodus, which is only 1,04-times as long as the merus, is rather slender, 7,3-times as long as wide and bears 9 rather short spinules, that are 0,066—0,146 mm. long, the three distal spinules being the longest of all. When measured from the proximal end of the anterior margin to the tip of the ventral hook, the dactylus, which is just 2,5-times as long as wide, appears to measure one-fourth the length of the propodus. The ventral hook, which is twice as long as broad at its base, measures one-fourth the distance between its tip and the proximal extremity of the anterior margin while it makes an obtuse angle with the posterior margin of the dactylus; this hook is subacute, its posterior margin is straight, the anterior slightly curved and, when examined under the microscope, the finely striated anterior wall appears twice as thick as the posterior. The tapering, pointed, dorsal hook, which is 3,4-times as long as broad at its base, is a little longer than the other and the ventral hook is one and a half as broad at its base as the dorsal; both hooks slightly diverge, but the angle they make with one another, is rounded.

In *Syn. streptodactylus* the dactyli of the third legs show a more slender form, being 3-times as long as wide at their base; the ventral hook is also more elongate, 2,5-times as long as wide at its base and the anterior wall of this hook is usually as thick as the posterior, rarely a little thicker, but never twice as thick; the dorsal hook, finally, that makes

an acute angle with the other, is half as thick at its base as the ventral and not longer than it.

The relative dimensions of the fifth legs are: merus 1,5; carpus 1; propodus 1,87; the merus is 4,5-times, the propodus 8-times as long as wide. The dactylus measures one-fourth the length of the propodus and has the same form as that of the third legs, being 2,6-times as long as wide at its base; the hooks present also the same features, but the dorsal hook is hardly longer than the other.

† 13. *Synalpheus Pococki* Cout.

Synalpheus neomeris var. *Pococki* H. Coutière, in: Bull. Soc. Entomol. France, 1898, N° 7, p. 167 and in: Bull. Muséum de Paris, 1900, N° 8, p. 411.
Synalpheus Pococki H. Coutière, in: Proc. U. S. Nat. Museum, 1909, p. 9.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 egg-bearing female.

This specimen is 12,5 mm. long and fully accords with the description. The three frontal spines project straight forward and are quite glabrous; the slender rostrum which is 3-times as long as wide at base, reaches almost the end of first antennular article whereas the supraorbital spines that are decidedly directed inward, are somewhat shorter, extending to the distal third of the visible part of first article.

The second article of the antennular peduncle measures almost two-thirds the visible part of the first, third article as long as the second; the stylocerite reaches to the distal fourth part of second article. Carpocerite a little longer than the antennular peduncle, surpassing it only by one-third the distal article; the terminal spine of the scaphocerite, the outer margin of which is distinctly concave, reaches as far forward as the carpocerite and projects by one-fifth of its length beyond the rounded tip of the rather broad scale which is but a little shorter than the antennular peduncle. The lower spine of the basicerite projects straight forward to the end of first antennular article, whereas the upper spine measures, in a lateral view, one-third of the lower and is directed upward.

The telson resembles that of *Syn. streptodactylus*. The proportion between its length and the width of the posterior margin, the outer angles of which are acute, though not at all prominent, is 2,86, proportion between the greatest width and that of the posterior margin 2,1; like in this species, the spinules of the upper surface that are 0,1 mm. long, are situated just in front of the middle, the proportion between the distance of the anterior pair from the posterior margin and the length of the telson being 1,9; the two pairs of spinules are situated rather close together, the proportion between their distances from the posterior margin being 1,45.

In both chelipeds the upper margin of the merus ends in a small spinule. The small chela which is 2,25 mm. long, presents the same proportions as that of *Syn. streptodactylus*: this chela is namely 3,2-times and the palm 1,95-times as long as high, whereas the proportion between the length of the chela and that of the fingers is 2,56. First carpal segment of second legs 4,71-times as long as thick distally, a little shorter than the following segments taken together.

The following legs are characteristic of this species. The merus of the third legs is 3,56-times as long as wide and armed with 2 spinules, long 0,1—0,12 mm., on the distal half of the posterior margin; carpus 2,2-times as long as wide; propodus slender, slightly arcuate, 6,7-times as long as wide and presenting only two small spinules, that are 0,1 mm. long, on the concave, posterior margin, besides two or three at the distal end; the first of these spinules is inserted a little posterior, the other a little anterior to the middle. COUTIÈRE figures 3 spinules instead of 2 on the posterior margin. The dactylus measures one-fourth the propodus and has a rather stout shape, the proportion between its length and the width at the base being 2,46. The conical ventral hook, that is hardly longer than broad at its base, measures only one-eighth the length of the dactylus; the dorsal hook, the posterior margin of which runs parallel with that of the other, is slightly longer, 3-times as long as broad at its base and almost half as broad at its base as the ventral hook. This leg bears only a few short setae, especially on the anterior margin of the joints.

The fourth legs closely resemble the third, but the merus, 3,5-times as long as wide, bears but one spinule long 0,066 mm. just in front of the middle and on the propodus, which is 6,46-times as long as wide, the first of the two spinules that occur on the posterior margin of the third legs, is wanting. The dactylus, finally, though for the rest agreeing, appears longer than one-fourth of the propodus, the propodus being 1,68 mm. long, the dactylus 0,49 mm. In the third legs the merus is 2,31-times, the propodus 2,44-times as long as the carpus; in the fourth legs these numbers are, for the merus 2,11, for the propodus 2,4. In both legs the dactyli show the same length, but, the propodus of the third legs being 1,13-times as long as that of the fourth, the dactylus of the fourth appears comparatively longer.

Eggs few in number, large, 1,3—1,4 mm. long, presenting two black eye-spots.

General distribution: Holothuria Bank, N. W. Australia (COUTIÈRE); Macclesfield Bank, Arafura Sea (COUTIÈRE); Albany passage, Torres Straits (COUTIÈRE).

† 14. *Synalpheus Iocasta* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1909, p. 119.

Stat. 71. May 10—June 7. Makassar and surroundings. Depth up to 32 m. Mud, sand with mud, coral. 1 ova-bearing female.

Stat. 116. July 12. 0° 58′.5 N., 122° 42′.5 E. West of Kwandang-bay-entrance. 72 m. Fine sand with mud. 2 specimens, one of which with eggs.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar-)island. 45 m. Lithothamnion. 1 ova-bearing female.

Stat. 164. August 20. 1° 42′.5 S., 130° 47′.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 15 specimens, most of which are ova-bearing.

Stat. 204. September 20. 4° 20′ S., 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. From 75—94 m. Sand with dead shells. 1 specimen.

Stat. 240. November 22 till December 1. Banda-anchorage. Lithothamnion-bank in 18—36 m. 1 female with eggs.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 4 specimens, 2 of which with eggs.

Stat. 274. December 26. 5° 28′.2 S., 134° 53′.9 E. Off Pulu Jedan. 57 m. Sand and shells. Stones. 1 young specimen.

Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 2 egg-bearing females; in one of them a parasite occurs on the lower side of the abdomen.

Stat. 285. January 18. 8° 39′.1 S., 127° 4′.4 E. Anchorage South coast of Timor. 34 m. Lithothamnion. 3 specimens, one of which with eggs.

Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 5 specimens, 2 of which with eggs.

Stat. 310. February 12. 8° 30′ S., 119° 7′.5 E. 73 m. Sapeh Strait. Sand with few pieces of dead coral. 7 specimens, 5 of which with eggs.

Synalpheus Iocasta, a new form of the *Neomeris* group, is most closely related to *Syn. Pococki* Cout., a species inhabiting the eastern parts of the Indian Archipelago, and is especially remarkable because of the great variability, presented by all its characters.

The frontal spines are obliquely directed downward, their tips not curved upward; the rostrum, 2,5-times as long as wide at its base, reaches to the distal third of the visible part of first antennular article and, as in *Syn. Pococki*, *Syn. streptodactylus* and other species, is separated from the lateral spines by the obliquely descending, anterior wall of the carapace; lateral spines with sharply pointed tips, a little shorter than the rostrum, longer than broad, distinctly turned inward and with their outer margin slightly concave at the base.

Second antennular article half as long as the visible part of the first, as long or hardly longer than the third, second article almost as broad as long; stylocerite reaching to the 2nd third or to the middle of second article.

Lower spine of the basicerite almost as long as first antennular article, upper spine half as long as the lower. Carpocerite 3,66-times as long as wide and surpassing the antennular peduncle by one-half or two-thirds the length of the distal article; outer margin of scaphocerite slightly concave, lateral spine straight, almost as long as the carpocerite or as long or hardly longer than the antennular peduncle and surpassing by one-fourth of its length the scale which is 5-times as long as wide.

Sometimes, as in the female N° 4 (Table A) from Stat. 164, the rostrum is much shorter, considerably shorter than the lateral spines and not yet reaching the middle of the visible part of first antennular article, in other specimens from the same Station it hardly reaches beyond the middle of this visible part and projects horizontally forward, while the lateral spines are slightly directed downward; in other specimens the lateral spines are hardly shorter than the rostrum and directed straight forward or slightly outward, whereas the stylocerite hardly surpasses the first antennular article, in other ones the lower spine of the basicerite is shorter, hardly projecting beyond the supraorbital spines. All these differences are regarded as being individual. As is shown by Table A, the measurements of the telson are much variable. So e. g. in the female from Stat. 285 the length of the telson equals 2,47-times, in that from Stat. 273 3,1-times its posterior margin, but the Table proves that all possible, intermediate proportions are also observed. The outer angles of the posterior margin are spiniform, half as long as the contiguous short spinules; the posterior margin is rather prominent in the middle, almost semicircular. Spinules of upper surface 0,13—0,17 mm. long, sometimes, as in the female N° 2 from Stat. 116, 0,11 mm.; the anterior pair of these spinules that are situated not far from the lateral margins, are inserted more or less before the middle, as in *Syn. Pococki*,

and the proportion between the distances of both pairs from the posterior margin is much the same as in *Syn. streptodactylus*, whereas in *Syn. Pococki* the two pairs are placed closer together.

The external maxillipeds project with half their terminal joint beyond the tip of the carpocerite.

Merus of large cheliped twice as long as broad, with a small spine at the apex of the upper margin; the chela resembles that of *Syn. Pococki* and one observes a curved spine at the anterior margin of the palm. Merus of small cheliped 2,46-times as long as broad, also with a spinule at the apex of the upper margin. Relative dimensions of the small chela: fingers 1; total length 2,54—2,72; height 0,76—0,8.

In the female, long 12,5 mm., from Stat. 282 the first carpal segment of the second legs is 5,75-times as long as thick and distinctly longer than the sum of the following; in the female, long 12 mm., from Stat. 310, in which the eggs present a large size, that proportion between length and thickness of the first segment is 4,4 and this segment appears here a little shorter than the sum of the following. Intermediate proportions 5, 5,6 and 5,65 were, however, also met with respectively in the ova-bearing specimens taken at the Stations 310, 285 and 116, so that we may conclude that these numbers are rather variable.

The same variability with regard to the dimensions and their proportions was observed in the following legs, as is proved by the Tables C and D. Sometimes the merus and the propodus of the third and fourth legs are of equal length, in other specimens the merus appears longer than the propodus or shorter than it, and the proportion between the length of these joints and that of the carpus is also quite variable. As regards the proportion between the length and the width of the joints (Table D) a similar variability is observed, but here also all intermediate proportions occur. The merus of the third legs, which bears one or two spinules, long 0,07—0,1 mm., is 3,5—4,14-times (rarely, N° 4, 3,23-times) as long as wide, the propodus 5—6,75-times, but the intermediate proportion 6 also often occurs; the propodus is armed with 7—10 spinules which are 0,1—0,18 mm., rarely 0,08 mm., long, besides those at the distal extremity. Different from *Syn. Pococki* the propodi are in this species nearly straight, not conspicuously curved as in that species. The dactyli, measured from the proximal end of the anterior margin to the extremity of the ventral hook, usually appear to be one-third or a little more than one-third of the propodus, sometimes, as in the female N° 4, two-fifths, or rarely, as in the female N° 10 of Table D, they are slightly shorter than one-third. As in *Syn. Pococki* the dactyli are sickle-shaped, but they are more slender, 3—3,5-times as long as broad at their base, rarely, as in the female N° 10, less than 3-times. Ventral or principal hook usually shorter than in *Syn. Pococki*, measuring $^1/_{14}$—$^1/_{17}$ of the total length of the dactylus, and a little broader at its base than it is long; dorsal hook a little longer, reaching for a short distance beyond the other. The lower or posterior margin of the dactylus appears regularly concave without any prominence and, examined under the microscope, appears to thicken gradually until to the distal sixth part of the joint and it then again narrows towards the tip of the ventral hook; in that thickened part of the margin fine oblique striae are observed; the anterior margin is also slightly thickened, though in a much

less degree. The inner margins of the hooks are continued for a short distance into the interior of the joint, being here apparently coalesced.

The fourth legs agree with the third and I refer to the Tables. The merus bears one small spinule long 0,04—0,07 mm. just beyond the middle or quite in the middle of the posterior margin and the posterior margin of the propodus bears 5—8 spinules, long 0,08—0,17 mm., besides those at the distal extremity: the female N° 4 from Stat. 273 makes an exception, the 5 spinules are shorter than usually, 0,046—0,06 mm. long. The dactyli measure two-fifths of the propodus, sometimes they are a little shorter or a little longer, and they are 3,1—3,33-times as long as wide at their base. In the female N° 10 from Stat. 310 they measure just one-third the length of the propodus and are 2,7-times as long as broad; in this female the ventral hook measures $^1/_9$ the length of the dactylus and appears slightly longer than broad at its base, so that the dactylus more resembles those of *Syn. Pococki*. In the other more typical specimens the ventral hook measures $^1/_{15}$—$^1/_{20}$ the length of the dactylus.

The third and the fourth legs are much more setose than those of *Syn. Pococki*.

Table A does not only show the variable length of the ova-bearing females, but also the variable size and number of the eggs: in two females from Stat. 310 the eggs are extraordinarily large.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.	N° 10.	N° 11.	N° 12.	N° 13.
Length of female	12	10	9,5	10—11,5	12	8,5—10	12,5	12	10,5	10	12	11,5	10
Length of eggs	0,7—0,8	0,75	0,6—0,7	0,7—0,85	0,7—0,8	0,9—1	0,7	0,95	0,75—0,85	0,9	1,7	0,76—0,8	1,5
Number of eggs	50	15	12	15—20	20	10	100	10	20	10	3	40	8

N° 1 Stat. 71; N° 2 Stat. 116; N° 3 Stat. 144; N° 4 Stat. 164; N° 5 Stat. 240; N° 6 Stat. 273; N° 7 and 8 Stat. 282; N° 9 Stat. 285; N° 10 Stat. 305; N° 11—13 Stat. 310.

Table B.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.	N° 10.
Proportion between length of telson and width of posterior margin.	2,93	2,55	2,65	3,1	2,72	2,5	3	2,54	2,76	3
Proportion between the greatest width and that of the posterior margin	2	1,9	2	2	2	1,93	2,1	2	2	2,1
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,7	1,75	1,66	1,73	1,86	1,94	1,82	1,81	1,62	1,65
Proportion between the distances of the two pairs of spinules from the posterior margin .	1,63	1,63	1,62	1,6	1,59	1,71	1,54	1,54	1,55	1,76

N° 1 Stat. 116; N° 2 and 3 Stat. 164; N° 4 Stat. 282; N° 5 Stat. 285; N° 6—8 Stat. 305; N° 9 and 10 Stat. 310.

Table C.

Relative measurements of the third and fourth legs.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.	N° 10.
Merus	of third legs	2,41	2,27	2,5		2,21	2,25	2,33	2,36	2,23	2,33
Carpus	of third legs	1	1	1		1	1	1	1	1	1
Propodus	of third legs	2,41	2,12	2,26		2,42	2,25	2,08	2,15	2	2,32
Merus	of fourth legs	2,1	2	2,21	1,92		2,06	2,26	2,15	2,1	2,08
Carpus	of fourth legs	1	1	1	1		1	1	1	1	1
Propodus	of fourth legs	2,24	2,07	2,21	1,88		2,2	2,13	2,12	2,14	2,25

N° 1 Stat. 116; N° 2 and 3 Stat. 164; N° 4 Stat. 273; N° 5 Stat. 274; N° 6 Stat. 282; N° 7 Stat. 285; N° 8 Stat. 305; N° 9 and 10 Stat. 310.

Table D.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.	N° 7.	N° 8.	N° 9.	N° 10.
Length of the merus	of third legs	1,45	1,5	1,5	1,1	0,84	1,8	1,7	1,7	1,45	1,56
Width of the merus	of third legs	0,353	0,428	0,406	0,34	0,21	0,48	0,41	0,48	0,412	0,408
Proportion between length and width of the merus	of third legs	4,1	3,5	3,7	3,23	4	3,75	4,14	3,54	3,52	3,82
Length of the carpus	of third legs	0,6	0,66	0,6	0,54	0,38	0,8	0,73	0,72	0,65	0,67
Width of the carpus	of third legs	0,25	0,3	0,28	0,24	0,16	0,33	0,28	0,29	0,28	0,3
Proportion between length and width of the carpus	of third legs	2,4	2,2	2,1	2,25	2,4	2,4	2,6	2,5	2,32	2,23
Length of the propodus	of third legs	1,45	1,4	1,36	1,05	0,92	1,8	1,52	1,55	1,32	1,55
Width of the propodus	of third legs	0,215	0,265	0,255	0,206	0,15	0,29	0,25	0,26	0,254	0,256
Proportion between length and width of the propodus.	of third legs	6,75	5,28	5,33	5	6,1	6,2	6	6	5,2	6
Length of the dactylus	of third legs	0,52	0,52	0,55	0,4	0,35	0,63	0,52	0,53	0,51	0,47
Width of the dactylus.	of third legs	0,146	0,17	0,18	0,145	0,1	0,21	0,16	0,15	0,17	0,17
Length of the merus	of fourth legs	1,2	1,2	1,24	0,92	0,7	1,48	1,4	1,4	1,18	1,25
Width of the merus	of fourth legs	0,27	0,34	0,33	0,285	0,17	0,386	0,315	0,37	0,325	0,334
Proportion between length and width of the merus	of fourth legs	4,44	3,52	3,76	3,23	4,12	3,84	4,44	3,8	3,63	3,74
Length of the carpus	of fourth legs	0,57	0,6	0,56	0,48	0,32	0,72	0,62	0,65	0,56	0,6
Width of the carpus	of fourth legs	0,25	0,26	0,26	0,22	0,14	0,3	0,26	0,26	0,26	0,27
Proportion between length and width of the carpus	of fourth legs	2,3	2,3	2,1	2,2	2,4	2,4	2,4	2,5	2,15	2,2
Length of the propodus	of fourth legs	1,28	1,24	1,24	0,9	0,84	1,58	1,32	1,38	1,2	1,35
Width of the propodus	of fourth legs	0,195	0,235	0,235	0,196	0,13	0,26	0,22	0,24	0,23	0,225
Proportion between length and width of the propodus.	of fourth legs	6,56	5,28	5,28	4,6	6,46	6,1	6	5,75	5,22	6
Length of the dactylus	of fourth legs	0,5	0,5	0,54	0,38	0,32	0,64	0,51	0,5	0,48	0,45
Width of the dactylus.	of fourth legs	0,15	0,16	0,17	0,12	0,09	0,21	0,155	0,16	0,16	0,166

N° 1 Stat. 116; N° 2 and 3 Stat. 164; N° 4 Stat. 273; N° 5 Stat. 274; N° 6 Stat. 282; N° 7 Stat. 285; N° 8 Stat. 305; N° 9 and 10 Stat. 310.

All are ova-bearing females, except N° 5 that is a very young specimen and N° 8 a male.

Synalpheus Iocasta differs from *Syn. Pococki* Cout. at first sight by the different form and characters of the propodi of the three posterior legs.

† 15*a*. *Synalpheus paraneomeris* Cout. var. *praedabundus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 123.
Confer: H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. LXXI, fig. 7.

Stat. 34. March 27. Anchorage off Labuan Pandan, Lombok. Coralreef. 2 young specimens.
Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. Coralreef. 1 ova-bearing female.
Stat. 129. July 22/23. Anchorage off Kawio- and Kamboling-islands, Karkaralong-group. Reef. 4 specimens, 2 of which with eggs.
Stat. 250. December 6/7. Anchorage off Kilsuin, West-coast of Kur-island. Reef. 3 specimens, 1 of which with eggs.

These specimens show a few slight differences from the typical form of *Syn. paraneomeris* Cout. and are therefore described as a new variety: the specimens taken at Stat. 129 are regarded as the types of this variety. Rostrum and lateral frontal spines as in the typical species (H. COUTIÈRE, l. c. fig. 7′), but they are more acuminate and the tips of the lateral spines are distinctly turned inward. Carpocerite 3,54-times, in the typical species 4-times as long as wide; scaphocerite, lower spine of the basicerite, antennular peduncle and stylocerite exactly as in the typical form.

Telson a little shorter and a little less wide anteriorly with regard to the width of the posterior margin than in the variety *halmaherensis*; anterior pair of spinules, long 0,16 mm., usually situated a little before the middle, rarely just in the middle, but never, as in the variety *halmaherensis*, posterior to the middle. The spinules of the upper surface are a little farther remote from the lateral margins than in the typical species and than in the variety *halmaherensis*, they are situated as in the variety *prolatus*; posterior margin as in the typical species, the outer angles, however, acute.

The two chelipeds apparently accord with those of the typical species (COUTIÈRE, l. c., fig. 7*a*, 7*b*), but the upper margin of the merus ends in a small acute tooth.

Merus of second legs 5,8—6-times as long as wide; first carpal segment 5—5,3-times as long as thick, slightly shorter than the sum of the following, second segment a little longer than the third, third as long or a little longer than the fourth; the chela, the fingers of which are hardly longer than the palm, appears a little more than one and a half as long as the fifth segment. Relative dimensions of the third legs: carpus 1; merus 2; propodus 1,64 or: carpus 1; merus 1,94; propodus 1,63. Merus 3,56—3,58-times as long as wide, of a stouter shape than in the typical species, in which it is 4-times as long as wide; propodus 5,53—5,75-times as long as wide, armed with 6 or 7 spinules, that are 0,15—0,16 mm. long. The length of the dactylus, measured from the proximal end of the anterior margin to the tip of the ventral hook, is a little more than one-fourth the propodus; the dorsal hook appears decidedly longer than the other, which, at its base, is one-third thicker than the dorsal hook. Relative dimensions of the fourth legs: carpus 1; merus 1,8; propodus 1,7 or carpus 1; merus 1,85; propodus 1,71. Merus 3,38—3,42-times, propodus 5,66—5,46-times as long as

wide, the merus stouter than in the typical form; propodus with 6 spinules, that are 0,146 mm. long.

Ova 0,8—0,82 mm. long.

The largest of the four specimens, the ova-bearing female, is 14 mm. long.

The largest specimen from Kur-island is the ova-bearing female, long 10 mm.; the eggs are larger than those of the described specimens from Stat. 129, viz. 1—1,17 mm. long. These specimens resemble the preceding, but the second legs have a stouter form, probably due to their smaller size: the merus is 5,4-times as long as wide, the first segment of the carpus 4,4½times as long as thick, the third slightly longer than the second, the chela twice as long as the 5th segment and the third segment appears a little larger than the second. The relative dimensions of the third legs are: carpus 1; merus 1,98; propodus 1,72; these joints, like also the dactylus, have the same form as in the preceding specimens.

The eggs of the female, long 12,5 mm., from Stat. 37 are 0,73 mm. long; though the legs are missing, it seems to belong to the same variety as the specimens from Stat. 129.

The two young individuals from Stat. 34, finally, approach to the typical species which occurs in the Maldive and Laccadive Archipelagoes, by the more slender form of the meri of the third and fourth legs. The relative dimensions of the third legs are, in the younger specimen, which is 8 mm. long: carpus 1; merus 2,16; propodus 1,9; the merus is 3,86-times, the propodus 6,3-times as long as wide and there are 6 propodal spinules.

Table.

	N° 1.	N° 2.	N° 3.	N° 4.
Proportion between length of telson and width of posterior margin	2,43	2,4	2,35	2,5
Proportion between the greatest width and that of the posterior margin . .	1,9	1,88	1,7	1,93
Proportion between the length of telson and the distance of the anterior pair of spinules from the posterior margin	2	1,75	1,7	1,8
Proportion between the distances of both pairs of spinules from the posterior margin	1,73	2	1,9	2

N° 1 and 2 Stat. 129; N° 3 ova-bearing female from Kur-island; N° 4 younger specimen from Stat. 34.

† 15*b*. *Synalpheus paraneomeris* Cout. var. *prolatus* Cout.

Synalpheus paraneomeris H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. LXXI, Fig. 7.
Synalpheus paraneomeris prolatus H. Coutière, in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 9.

Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 egg-bearing female.
Stat. 209. September 23. Anchorage off the south point of Kabaëna-island. Reef. 1 ova-bearing female.

Together with the two specimens of the new variety *halmaherensis*, an ova-bearing female was collected at the same Station, which is referred to the variety *prolatus* Cout. with much doubt not only because a proper description of this variety does not exist, as far as I know, but still more because this specimen does not fully accord with the quoted figure 7 of Coutière's paper, on which this form is represented.

The rostrum, 3-times as long as wide at its base and reaching almost the end of basal antennular article, agrees, like also the lateral spines, with the quoted Fig. 7: the rostrum appears more slender than in the typical species, Fig. 7′, and than in the variety *halmaherensis*. The visible part of the first antennular article appears, however, distinctly longer than in Fig. 7 and nearly as long as the second and the third taken together; the second article is slightly longer than wide and the third slightly shorter than the second, the stylocerite, finally, extends only to the middle of the second article. It is especially on account of the different shape of this peduncle that the identification with the variety *prolatus* remains doubtful.

The carpocerite which surpasses the antennular peduncle almost by two thirds the distal article, is 3,7-times as long as wide and the lower spine of the basicerite appears a little shorter than the stylocerite; the scale, hardly as broad as in Fig. 7, is as long as the antennular peduncle and the terminal spine that distinctly surpasses the carpocerite, is slightly curved inward, while it appears quite straight in Fig. 7.

Telson 2,7-times as long as the posterior margin is broad, in the typical species 2,5-times, but a little less wide anteriorly, the proportion between the greatest width and that of the posterior margin being 1,92; the outer angles of the posterior margin are acute, though quite short. Of the spinules of the upper surface that are 0,12 mm. long and a little farther remote from the lateral margins than in the typical species, the anterior pair is situated more forward, anterior to the middle, the proportion between the length of the telson and the distance of that pair from the posterior margin being 1,84; the proportion, finally, between the distances of both pairs from the posterior margin is expressed by the number 1,65.

The large cheliped seems to agree with that of the typical species, but the merus which is 2,56-times as long as wide, bears a small, acute tooth at the apex of the upper margin; the small cheliped is missing. Merus of second legs 6-times as long as wide; first segment (1,17 mm.) of the carpus 5,8-times as long as thick, a little longer than the sum (1 mm.) of the following; the three following segments slightly decrease in length from the second to the fourth, fifth segment a little longer than the second and the third taken together; chela (0,84 mm.) slightly shorter than the four last segments combined.

Following legs as in the typical species. The relative dimensions of the third pair are: merus 2,1; carpus 1; propodus 2. Merus 3,8-times, propodus 6,7-times as long as wide, the propodus with 6 spinules long 0,13—0,16 mm. Dactylus two-sevenths of the propodus and 2,5-times as long as wide near the articulation, when measured from the proximal extremity of the anterior margin to the tip of the ventral hook, the latter as long but a little more than twice as thick at its base as the dorsal hook; posterior margin as in the typical species (Fig. 7*d*″).

The relative dimensions of the fourth legs are: merus 1,97; carpus 1; propodus 2,05. Merus 4-times, propodus 6,8-times as long as wide, the latter with 6 spinules; dactylus as in the third legs.

Eggs small, 0,65 mm. long. This specimen is 12 mm. long.

The female from Stat. 209, which is 11 mm. long, is referred to the same variety, because the terminal spine of the scaphocerite also surpasses the carpocerite, which has the same form as in the preceding specimen. This female, however, which has lost the large cheliped, shows

some differences from the female taken off the island of Waigeu. The rostrum is shorter, 2,5-times as long as wide at base and extends to the distal third of the visible part of basal antennular article. Third antennular article hardly shorter than the second. Lateral spine of basicerite slightly longer than the stylocerite that reaches to the middle of median article.

The telson is 2,41-times as long as the posterior margin is wide, proportion between the latter and the width at base 1,94. The spinules of the upper surface are 0,15 mm. long, but arranged exactly as in the specimen from Stat. 152, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,83, while the proportion between the distances of both pairs from the posterior margin is indicated by the number 1,7.

The second and following legs present a less slender form than in the other specimen. Merus of second legs 5-times as long as wide, first carpal segment 4,5-times as long as thick, just as long as the sum of the four following. Relative dimensions of third pair: merus 2,1; carpus 1; propodus 2,1. Merus 3,2-times, propodus 5,6-times as long as wide, the latter with 7 spinules, long 0,16—0,2 mm. Dactylus two-sevenths the propodus and 2,7-times as long as wide. Eggs 0,8—0,88 mm. long.

General distribution: Djibouti, Mascate, Mahé, Maldive and Laccadive Archipelagoes (Coutière).

† 15*c*. *Synalpheus paraneomeris* Cout. var. *halmaherensis* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1909, p. 122.
Confer: H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. LXXI, fig. 7.

Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 male and 1 egg-bearing female.

On Plate LXXI of the quoted paper, Fig. 7 apparently represents the "*oxyceros*" form, for which Coutière has recently created the name *Syn. paraneomeris prolatus* (in: Proc. U. S. Nat. Mus. 1909, p. 9), while Fig. 7′ represents the typical species; unfortunately the author did not indicate to which form the other figures belong, to the typical species or to the subspecies *prolatus*. Though according to Coutière this species is a rather variable form, I prefer to describe the two specimens taken in the Halmaheira Sea as a distinct variety.

Rostrum triangular with converging lateral margins as in the typical species (l. c. Fig. 7′), but longer, reaching almost to the end of the first antennular article, acute, a little more than twice as long as broad at its base; lateral spines also pointed and acute, a little shorter than the rostrum, as in Fig. 7, but with the inner margins concave.

The telson of the male much resembles Fig. 7*e* (l. c.), but the spinules of the upper surface that are 0,12 mm. long, are situated a little more backward; in the female which is larger, the telson is somewhat longer, the width of the posterior margin being just one-third the length (Table A).

The antennular peduncle resembles that of the variety *prolatus* (Coutière, l. c. Fig. 7); the second article, one-fourth shorter than the visible part of the first, appears distinctly somewhat

wider, at the apex, than long and the third article is one-fourth longer than the second; the stylocerite extends to the distal fifth part of the second article.

Basicerite unarmed above, lateral spine a little shorter than the stylocerite and reaching to the middle of second antennular article; carpocerite 3-times as long as wide, in the typical species 4-times (H. COUTIÈRE, in: Bull. Soc. Philom. Paris, Sér. IX, T. XI, 1908, p. 5) and surpassing the antennular peduncle by about two-thirds the third article; scale rather broad, as in Fig. 7 (l. c. 1905), its width being one-fifth the total length of the scaphocerite, the scale just as long as the antennular peduncle, terminal spine a little shorter than the carpocerite. The female has lost both chelipeds, the male possesses only the small one. In this cheliped the merus is $2^1/_3$-times as long as wide, the upper margin bears a small, acute tooth at the apex; the relative dimensions of the chela are: fingers 1; total length 2,66; height 0,94, the chela being 2,85-times as long as high.

The second legs of the male resemble those of the typical species. Merus 5,84-times as long as thick. First segment (1,25 mm.) of the carpus 5,3-times as long as thick distally and slightly longer than the sum (1,16 mm.) of the following; fifth segment as long as the second and the third together, the third slightly longer than the second; chela (1 mm.) twice as long as the fifth segment.

Relative dimensions of the third legs in the male: merus 2,1; carpus 1; propodus 1,8. Merus 3,8-times, propodus 6-times as long as wide, the latter with 6 spinules long 0,14—0,16 mm. According to COUTIÈRE's description (l. c. 1905) the merus should be 4,5-times, the propodus 8-times as long as wide and the propodus should be armed with 5 or 6 spinules; in another paper, however, in: Bull. Soc. Philom. Paris, 1908, p. 5 the merus is described as being 4-times as long as wide and the propodus with 8 spinules. The length of the dactylus, measured from the proximal extremity of the anterior margin to the extremity of the ventral hook, appears to be one-fourth the length of the propodus and 2,4-times as long as the dactylus is wide near the articulation; the dactylus accords with Fig. 7*d''* of the original description, the dorsal hook appears a little more than half as thick, but decidedly longer than the other and one observes a slight, obtuse prominence on the posterior margin. The anterior margin of these legs is a little setose.

The relative dimensions of the fourth legs are in the female: merus 1,8; carpus 1; propodus 1,8. Merus 3,7-times, propodus 6-times as long as wide, the latter with 5 spinules long 0,15 mm. Dactylus as in the third pair.

Ova small, 0,6 mm. long.

The ova-bearing female is 16 mm. long, the other specimen is a little shorter.

Table A.

	N° 1. ♂	N° 2. ♀
Proportion between length of telson and width of the posterior margin	2,67	3
Proportion between the greatest width and that of the posterior margin	2,1	2,1
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	2,3	2,1
Proportion between the distances of both pairs of spinules from the posterior margin .	1,675	1,86

† 16. *Synalpheus Charon* (Heller).

Alpheus Charon C. Heller, in: Sitzungsber. Kais. Akad. Wiss. Wien, Bd. XLIV, 1861, p. 272, Taf. III, Fig. 21, 22.

Synalpheus Charon H. Coutière, Les Alphéidae, 1899, p. 264, Fig. 331, 332, 332bis and in: Alpheidae Mald. and Laccad. Archip. 1905, p. 873 and in: Proc. U. S. Nat. Museum, XXXVI, 1909, p. 90.

Nec: *Alpheus Charon* J. G. de Man, in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 743, Taf. 35, Fig. 63.

Stat. 209. September 23. Anchorage off the south point of Kabaëna-island. Reef. 1 not yet full-grown specimen without eggs.

Rostrum acute, spiniform, twice as long as wide at its base, reaching almost to the end of first antennular article, with the margins straight and converging from the base to the tip; supraorbital spines also acute and pointed, one-third shorter than the rostrum, with the inner margins concave and separated from the rostrum by broad interspaces; outer margins also slightly concave. The supraorbital spines that are wider at their base than long, are, like the rostrum, glabrous and directed slightly downward. Anterior wall of the front partly visible from above, at either side of the rostrum.

Second antennular article just as long as wide, one-fourth shorter than the visible part of first article, third about as long as second; stylocerite extending to the distal fourth part of second article. The carpocerite, 3-times as long as wide, extends beyond the antennular peduncle almost by the whole length of the third article; lower spine of basicerite shorter than the stylocerite, reaching almost to the middle of second antennular article. The outer margin of the scaphocerite is slightly concave, the terminal spine which is not curved inward and which is as long as the carpocerite, exceeds the rounded tip of the scale by one-fourth of its length, while the scale is as long as the antennular peduncle. Superior angle of the basicerite rounded, truncate.

Telson 3-times as long as the posterior margin is wide, the outer angles of the latter are acute, though not at all prominent; greatest width 2,1-times that of the posterior margin, which is rather prominent. Spinules of upper surface small, 0,14 mm. long, inserted not far from the lateral margins; proportion between the length of the telson and the distance of the anterior pair from the posterior margin 2,1, proportion between the distances of both pairs from the posterior margin 1,7.

Merus of both chelipeds with a spiniform tooth at the apex of the upper margin. Large chela 6,4 mm. long, 2,5 mm. high, fingers 1,85 mm. long; proportion between the length and the height of the palm 1,8, proportion between the total length and the length of the fingers 3,45. A small, obtuse tubercle at the far end of the palm. The small chela has the following relative dimensions: fingers 1; total length 2,75; height 0,975, the chela 2,82-times as long (2,2 mm.) as high (0,78 mm.). Proportion between the length of both chelae 2,9. Merus of second legs 4,6-times as long as wide. The first segment of the carpus is 1 mm. long, 4-times as long as thick at the distal end and twice as long as the fifth, while it appears but a little shorter than the sum (1,1 mm.) of the four following segments. The chela, the fingers of

which are hardly longer than the palm, is 0,84 mm. long, almost as long as the first segment of the carpus. According to HELLER the first segment should be as long as the sum of the three following, a difference probably due to the larger size of his specimens.

Relative dimensions of the third legs: merus 2,2; carpus 1; propodus 1,9. The merus, 3,1-times as long as wide, bears some short setae on both margins, especially on the upper and a tuft of longer setae at the far end of the latter. The carpus, 2,27-times as long as thick, and the propodus, 5-times as long as wide, are on their anterior border beset with rather long setae and the posterior margin of the propodus bears, besides those at the distal extremity, five spinules which are 0,13—0,16 mm. long. The dactylus, measuring somewhat less than one-third of the propodus, has a rather stout form, being, from the proximal end of the anterior margin to the tip of the ventral hook, twice as long as wide near the articulation. The obtuse ventral hook which is as long as wide at its base, is spoon-shaped and excavate and makes an acute angle with the pointed dorsal hook which is just as long but hardly half as thick at its base as the other; the slightly curved, dorsal hook is grown together with a process of the superior border of the dactylus to a little beyond the middle and appears therefore thickened along its proximal half.

This specimen is 12,5 mm. long.

Remarks. This species, no doubt identical with that observed by COUTIÈRE, seems to be also the species described by HELLER, though, according to this author, the upper margin of the three posterior legs should be quite glabrous. The species, however, which was described by me (l. c. 1897) under the name of *Alpheus Charon*, is apparently a different form. The three frontal spines are otherwise shaped and, according to Fig. 63 of my paper, also the antennular peduncle, while the lateral spine of the scaphocerite is curved inward and hardly exceeds the scale; the telson appears a little shorter with regard to the width of the posterior margin. The third legs have a stouter form, the propodus is 4-times as long as wide and the dactylus also differs; the dactylus, indeed, measures a little more than one-third the propodus and is 2,5-times as long as broad at its base, while, in my description, nothing is said about the excavate appearance of the ventral hook. The two described specimens had been received by me from the Museum at Vienna under the name of *A. Charon* Heller and had been collected by the Novara-Expedition at the Nicobar Islands. We must therefore conclude that HELLER was mistaken when referring these specimens to the true *Syn. Charon* from the Red Sea and that he was misled by the apparent resemblance of both species. This different species may henceforth bear the name of *Syn. Helleri* (vide p. 194).

General distribution: Red Sea (HELLER); Maldive and Laccadive Archipelagoes (COUTIÈRE); Hawaiian Islands (COUTIÈRE).

† 17. *Synalpheus Nilandensis* Cout.

Synalpheus Nilandensis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 871, Pl. LXX, fig. 4.

Synalpheus Nilandensis G. Nobili, Ricerche sui Crostacei della Polinesia, Torino 1907, p. 353.

Stat. 51. April 19. Southern part of Molo-Strait. 70 m. Fine grey sand. 2 specimens.

Stat. 240. November 22 till December 1. Banda. Lithothamnion-bank in 18—36 m. 1 young specimen.

The two specimens from Stat. 51 are 10 mm. long, that from Banda 7 mm. In one specimen from Madura-bay the rostrum, somewhat shorter than the orbital spines, reaches only to the middle of the visible part of first antennular article; the lower spine of the basicerite is slightly directed outward and is longer than the slightly divergent orbital spines, but does not attain the apex of first antennular article. In the other specimen the orbital spines diverge more outward, more than in COUTIÈRE's figure 4 (l. c.); they hardly reach the middle of the visible part of the first antennular article, whereas the rostrum, distinctly shorter, extends to the 2nd third part of the latter. The stylocerite reaches to the end of first article and the lower spine of the basicerite is much shorter than the stylocerite, though reaching beyond the orbital spines. In this specimen the merus of third legs, which is armed with 5 spinules, is 3,7-times as long as broad, the carpus is 2,3-times as long as thick and the propodus which bears 8 spinules on its posterior margin, is 5,85-times as long as wide; as regards their relative dimensions, we must remark that the merus is 2,56-times, the propodus 2,23-times as long as the carpus. The dactylus which fully accords with Fig. 4*c'* of the original description, measures one-fourth of the propodus and is just twice as long as broad at its base, when its length is measured from the propodal articulation, along the anterior margin, to the tip of the dorsal hook. Merus of fourth legs with 2 spinules, 3,73-times as long as wide; carpus 2,2-times as long as thick; propodus with 8 spinules, 5,5-times as long as wide; dactylus as in the third legs. The merus is 2,3-times, the propodus 2,2-times as long as the carpus.

The slight differences, presented by these two specimens as regards the length and the direction of the orbital spines and of the rostrum, are considered as individual, because in the specimen taken at Banda these three spines fully accord with the type (COUTIÈRE, l. c. Fig. 4); the rostral and the orbital spines are distinctly curved upward, especially in the larger specimens from Stat. 51.

In the young specimen from Banda the merus of third legs with its 4 or 5 spinules appears somewhat more slender, viz. 4,3-times as long as wide; the carpus is 2,3-times as long as thick, the propodus, with 7 spinules, appears 6,2-times as long as wide; dactylus as in the preceding specimen.

The proportion between length and width of these joints, especially of the propodus, proves to be somewhat variable, just as in the variety *bandaensis*.

The large cheliped fully resembles that of *Syn. neomeris* (J. G. de Man, in: Zoolog. Jahrb. X, Abth. f. Syst. 1897, Pl. 35, Fig. 61*a*).

In the other specimen from Stat. 51 the telson appears 2,66-times as long as the posterior margin is wide. The anterior pair of spinules, which are 0,14 mm. long, are inserted a little in front of the middle, the posterior pair one and a half as far distant from the posterior margin as from the anterior pair. In the young individual from Banda the proportion between the length of the telson and the width of the posterior margin is 2,56; the arrangement of the spinules, long 0,12 mm., on the upper surface is the same as in the preceding specimen.

General distribution: Maldive Archipelago (COUTIÈRE); Mangarewa, Tearia (NOBILI).

† 17*a*. *Synalpheus Nilandensis* Cout. var. *bandaensis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 121.

Stat. 49ª. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 specimen without large cheliped.

Stat. 240. November 22 till December 1. Banda. Lithothamnion-bank in 18—36 m. 2 specimens, the larger of which with eggs.

This variety is especially characterized by the shape of the dactyli of the three posterior legs.

The egg-bearing female is 14 mm. long, eggs not numerous, large, ovoid, 0,8 mm. long. The terminal spine of the scaphocerite, though distinctly longer than the antennular peduncle, does not quite reach to the apex of the carpocerite. In a lateral aspect the upper spine of the basicerite appears almost half as long as the lower, but, when the animal is looked at from above, the upper spine which is directed upward, appears comparatively shorter.

Telson 2,83-times as long as the posterior margin is wide, greatest width, anteriorly, 2,1-times as broad as the posterior margin, which resembles that of the type (COUTIÈRE, l. c. Fig. 4*d*); spinules of the upper surface large, 0,2 mm. long, anterior pair one and a half as far distant from the posterior margin as from the base, posterior pair one-third farther distant from the posterior margin as from the anterior pair.

The external maxillipeds extend with two-fifths of their terminal joint beyond the apex of the carpocerite. Merus of large cheliped with a small, acute tooth at the end of the upper margin. The chela resembles that of *Syn. neomeris* (J. G. de Man, in: Zool. Jahrb. X. Abth. f. Syst. 1897, Pl. 35, Fig. 61*a*), but the fingers are shorter, measuring one-third of the palm. The upper border of the palm of the small chela appears more regularly arcuate than in COUTIÈRE's figure 4*a*.

Second legs as in the typical species. The measurements of the third legs agree, with regard to the length of their joints, with those of the typical species; the merus is 3,75-times as long as wide and bears 4 spinules (in the other specimen from Banda the merus bears 5 spinules and the proportion between length and width is 3,65); the propodus appears in the female 6,2-times, in the other specimen 6,5-times as long as broad and is armed with 9 spinules. The dactylus has another form than in the type species. When it is measured, along the anterior margin, from the propodal articulation to the end of the dorsal hook, the dactylus appears 2,5-times as long as broad at its base and it shows therefore a less stout form than in the typical species; the principal claw, though its form is the same as in the latter, is directed obliquely forward, making no right angle with the anterior margin, and the dorsal hook is stronger and measures two-thirds the length of the principal one.

Propodus of the fourth legs hardly shorter than the merus, the latter with 2 spinules; in the typical species the length of the merus is in proportion to that of the propodus as 11 : 10, in this female, however, the propodus is 1,65 mm. long, the merus 1,7 mm. In the other specimen from Banda, long 11,5 mm., the stylocerite reaches to the middle of second antennular article. Thoracic legs as in the female.

The specimen from Stat. 49[a] is 10,5 mm. long. The merus of third legs is 3,9-times as long as broad like in the type and the 5 spinules on the distal half are of a somewhat more slender form than in the specimens taken off Banda; carpus and propodus are also a little more slender, the propodus almost 7-times as long as wide, with 11 spinules on the posterior margin and, with regard to the merus, a little longer than in the specimens from Banda; dactylus as in the latter, though 3-times as long as broad at the base. Merus of fourth legs 4-times as long as wide, being even a little shorter than the propodus, the propodus being 1,5 mm. long, the merus 1,45 mm.; propodus 7-times as long as wide.

Remarks. The variety *oxyceros* Cout. is related to this one, but the principal claw of the dactylus is less oblique, the lower spine of the basicerite reaches the end of the second antennular article and the terminal spine of the scaphocerite extends far beyond the tip of the carpocerite.

† 17*b*. *Synalpheus Nilandensis* Cout. var. *oxyceros* Cout.

Synalpheus Nilandensis var. *oxyceros* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 871, Pl. LXX, Fig. 5, 5*a*.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 egg-bearing female.

It is with some doubt that this specimen, which is 9,5 mm. long, is referred to the variety *oxyceros*. The rostrum reaches to the end of first antennular article, the orbital spines which are directed straightly forward, are half as long; different from the typical species and from the variety *bandaensis*, the rostrum and the orbital spines are not curved upward at their tips. Second article of antennular peduncle very slightly more than half as long as the visible part of the first, a little broader than long; third article as long as second. Stylocerite reaching to the middle of second article. The inferior spine of the basicerite extends to the apex of second antennular article, upper spine hardly longer than the orbital spines. Carpocerite little longer than the antennular peduncle; the terminal spine of the scaphocerite extends with a little more than one-third of its length beyond the scale and it surpasses the antennular peduncle by the whole length of the third article. Telson 2,5-times as long as the posterior margin is broad, the latter half as broad as the greatest width; outer angles of the posterior margin spiniform, reaching almost to the middle of the prominent median part. Spinules of the upper surface large, 0,16 mm. long, arranged as in the variety *bandaensis*.

The external maxillipeds project with one-third their terminal joint beyond the carpocerite.

The large cheliped resembles that of *Syn. neomeris* (J. G. de Man, in: Zool. Jahrb. X, Abth. f. Syst. 1897, Pl. 35, Fig. 61*a*), but the palm is unarmed at the distal extremity; the fingers are therefore a little longer than in the variety *bandaensis*.

Second legs as in this variety. The fourth legs (the third are missing) and the fifth also fully accord with those of the variety *bandaensis*. Merus of fourth legs with 2 spinules just beyond the middle, long 0,08 mm., the merus 3,52-times as long as wide; carpus 2,17-times as long as thick, propodus a little shorter than the merus, 5,7-times as long as wide, with 7 spinules.

The merus of the fourth legs is 2,27-times, the propodus 2,08-times as long as the carpus. The dactylus much resembles COUTIÈRE's figure 5*a*, but the principal claw appears comparatively less thick, only twice as thick at the base as the dorsal claw; it ought, however, to be remarked that Fig. 5*a* represents the dactylus of the third legs.

Eggs few in number, large, 0,8 mm. long.

General distribution: Maldive Archipelago (COUTIÈRE).

† 18. *Synalpheus fossor* (Paulson) var. *propinqua* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 121.
Confer: PAULSON, Recherches sur les Crustacés de la Mer Rouge (en russe), 1875, p. 103, Pl. 13, fig. 5; H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. VII, fig. 6.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 1 ova-bearing female.
Stat. 164. August 20. 1°42′.5 S., 130°47′.5 E. Near West New Guinea. 32 m. Sand, small stones and shells. 1 male and 1 female.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 young specimen.
Stat. 282. January 15/17. 8°25′.2 S., 127°18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 adult, ovigerous female and 2 young specimens.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 male and 1 ova-bearing female.

Through the kindness of Professor COUTIÈRE two specimens, a male and a female, from Reef Naifaro, Maldives, which in the quoted paper were referred by him to *Syn. fossor* (Paulson), are lying before me. According to the measurements in Table D, the legs of the third and fourth pairs show, in these two specimens, a somewhat less slender form than in those which were collected by the "Siboga": so e. g. are the meri of the third legs in the female from Naifaro Reef 3-times, in the male 2,875-times as long as wide, whereas in the "Siboga" specimens this proportion varies between 3,38 and 3,61. According to COUTIÈRE himself (in: Bull. Soc. Philom. Paris, T. XI, 1908, p. 7) the merus of the third legs should be, in *Syn. fossor*, 3,55-times as long as wide, just as in the "Siboga" specimens. Like e. g. *Syn. Iocasta*, also PAULSON's species may therefore once prove to belong to those forms in which the measurements are variable with regard to their proportions and this supposition appears the more probable, because in the specimens taken by the "Siboga" the form of the small chela is also variable: this chela, indeed, presents a less slender form in the adult female from Stat. 282 than in the other specimens and resembles almost that of the specimens which were collected at the Reef Naifaro.

Both in the semi-adult male and in the adult female from the Naifaro Reef the propodi of the third legs bear five spinules, in the specimens collected by the "Siboga", however, eight or nine, rarely, as in the adult female from Stat. 164, seven spinules and even the slender propodus of the third legs of the young specimen, long 9 mm., from Stat. 273 bears already six spinules, besides those at the distal extremity of the posterior margin.

I now propose to consider the specimens from the Reef Naifaro as the typical form of *Syn. fossor* (Paulson), from which the variety *propinqua* differs by the more slender shape of the meri and propodi of the three posterior legs and by the larger number of propodal spinules.

In other respects the specimens collected by the "Siboga" resemble those from the Reef Naifaro, except the small chela, which in the former usually also shows a more slender form, though not as a rule (Table B). I will, finally, add some observations about the "Siboga" specimens. In the adult female from Stat. 96 the rostrum reaches to the middle of the visible part of first antennular article, the lateral spines which are directed straightly forward, are a little shorter, while the tips of the three spines are setose and slightly curved upward. The stylocerite reaches to the 2nd third part, the lower spine of the basicerite almost to the middle of second antennular article; the upper spine is slightly directed upward and appears, in a lateral view, almost half as long as the lower. The carpocerite extends beyond the antennular peduncle by somewhat more than the length of third article, the terminal spine of the scaphocerite, though much shorter than the carpocerite, just extends beyond the antennular peduncle, while the scale hardly surpasses the second antennular article, which is one and a half as long as the third.

In the male, not in the female, all the abdominal pleura terminate in a subacute, spiniform tooth; this tooth occurs in the first pleura at the posterior end of the lower margin, in the second a little more forward and in the following in the middle.

In the specimen from Stat. 96 the spinules on the upper surface of the telson are 0,36 mm. long, longer than in the others; in the male from Stat. 164 they are 0,24 mm. long, in the female 0,26 mm.; in the almost adult female from Stat. 282 they are 0,2 mm. long, as long nearly as in the specimens from the Reef Naifaro, in which these spinules measure 0,18 mm. We may therefore conclude that their length is also much variable. In the female from Stat. 96, in the other specimens captured by the "Siboga" and in the male from the Reef Naifaro the posterior margin surpasses but little the spiniform lateral angles, but in the female from that Reef the posterior margin extends much more backward.

In the female from Stat. 96 the merus of the large cheliped is twice as long as wide and the upper margin ends in a small, sharp tooth; there is an obtuse tubercle at the distal margin of the palm and another smaller one near the former. In the male from Stat. 164 the merus of the large cheliped is also twice as long as wide, but the fingers are a little longer.

In the second legs of the female from Stat. 96 the merus is 5,4-times longer than wide and a little shorter than the carpus, the first segment of the carpus is 4-times as long as thick and a little shorter than the sum of the following; in the female from Reef Naifaro the merus is only 4,3-times as long as wide and the first carpal segment 3,75-times longer than thick.

As regards the following legs I wish to remark that the length of the dactylus of the third legs, measured from the proximal extremity of the anterior border to the extremity of the principal hook, measures in all the specimens one-fifth of the propodus; like the other joints the dactyli are also a little more slender than those of the specimens from the Naifaro Reef and the ventral supernumerary hook is usually a little less prominent than in the species inhabiting the Maldive Archipelago.

Eggs moderately numerous, 1—1,1 mm. long.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Proportion between length of telson and width of the posterior margin	2,76	2,7	2,61	2,58	2,64	3
Proportion between the greatest width and that of the posterior margin	2,1	2,1	2	2,1	2	2,1
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,61	1,85	1,81	1,85	1,7	1,8
Proportion between the distances of both pairs of spinules from the posterior margin	1,5	1,64	1,6	1,65	1,54	1,57

Table B.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Length of the small chela	2,7	2,4	3,35	2,95	3,4	2,68
Height of the small chela	1,06	1	1,05	0,98	1,06	0,98
Proportion between length and height of this chela	2,55	2,4	3,2	3	3,2	2,73
Length of the fingers	0,9	0,85	1,2	1,1	1,25	0,95
Proportion between the length of this chela and that of the fingers	3	2,82	2,8	2,68	2,72	2,82
Proportion between length and height of the palm	1,7	1,55	2	1,9	2	1,76

Table C.

Relative measurements of the third and fourth legs.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Merus	of third legs	2,5	2,55	3	2,72	2,7	2,53
Carpus	of third legs	1	1	1	1	1	1
Propodus	of third legs	1,8	1,9	2,12	2,06	2,05	1,84
Merus	of fourth legs	2,3	2,34	2,66	2,58	2,66	2,47
Carpus	of fourth legs	1	1	1	1	1	1
Propodus	of fourth legs	1,74	1,83	2	2	2,1	1,93

Table D.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Length of merus	of the third legs	2,6	2,3	3	2,5	2,7	2,28
Width of merus	of the third legs	0,88	0,8	0,83	0,74	0,75	0,65
Proportion between length and width of merus	of the third legs	3	2,875	3,61	3,38	3,6	3,5
Length of carpus	of the third legs	1,05	0,9	1	0,92	1	0,9
Width of carpus	of the third legs	0,5	0,42	0,47	0,42	0,46	0,39
Proportion between length and width of carpus	of the third legs	2,1	2,1	2,1	2,2	2,2	2,3
Length of propodus	of the third legs	5	5	9	8	7	9
Width of propodus	of the third legs	1,86	1,7	2,12	1,9	2,05	1,66
Proportion between length and width of propodus	of the third legs	0,42	0,37	0,41	0,38	0,39	0,34
Length of dactylus	of the third legs	4,43	4,6	5,1	5	5,25	4,9
Width of dactylus	of the third legs	0,37	0,34	0,42	0,34	0,36	0,33
Proportion between length and width of dactylus	of the third legs	0,2	0,19	0,19	0,16	0,16	0,17
	of the third legs	1,85	1,8	2,2	2,1	2,2	1,94

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Length of merus	of the fourth legs	2,16	1,92	2,4	2,06	2,26	1,85
Width of merus		0,72	0,63	0,63	0,58	0,6	0,52
Proportion between length and width of merus		3	3	3,81	3,55	3,76	3,56
Length of carpus		0,94	0,82	0,9	0,8	0,85	0,75
Width of carpus		0,42	0,36	0,4	0,34	0,39	0,32
Proportion between length and width of carpus		2,2	2,3	2,25	2,1	2,18	2,34
		5	4	7	6	7	6
Length of propodus		1,64	1,5	1,8	1,6	1,75	1,45
Width of propodus		0,39	0,33	0,35	0,32	0,34	0,28
Proportion between length and width of propodus		4,2	4,55	5,1	5	5,1	5
Length of dactylus		0,35	0,32	0,38	0,33	0,34	0,31
Width of dactylus		0,18	0,16	0,17	0,14	0,16	0,14
Proportion between length and width of dactylus		1,9	2	2,2	2,3	2,1	2,2

N° 1 female long 19 mm. and N° 2 male long 12 mm., both from Reef Naifaro; N° 3 adult female long 20 mm. from Stat. 96; N° 4 male long 15 mm. and N° 5 female long 19 mm., from Stat. 164; N° 6 ova-bearing female long 17 mm. from Stat. 282.

The numbers above the length of the propodi indicate with how many spinules the posterior margin of these joints is armed, exclusive those at the distal end.

As results from these Tables, the measurements of the female (N° 6) from Stat. 282 are more or less intermediate between those of the specimens from the Reef Naifaro and those of the other specimens collected by the "Siboga".

General distribution of the typical species: Red Sea (PAULSON); Reef Naifaro (COUTIÈRE).

† 19. *Synalpheus Bakeri* Cout. var. *Stormi* n.

Alpheus sp., varietas B, J. G. de Man, in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 741, Pl. 35, Fig. 62*c* and 62*cc*.

Confer: H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 9 and in: Proc. U. S. Nat. Museum, 1909, p. 91.

Balikpapan, east coast of Borneo, 5 specimens, of which 3 are adult and egg-bearing, collected by Mr. J. W. TISSOT VAN PATOT and belonging to the Zoological Museum of the University of Amsterdam.

Atjeh, one of the four specimens collected by Captain STORM and described by me in 1897 (l. c.); this specimen belongs to my private collection.

Synalpheus Bakeri was founded by COUTIÈRE in 1908 on 2 specimens, a male and a female, from South-Adelaide, South Australia; as the above mentioned specimens show some slight differences from COUTIÈRE's descriptions, they will here be described as a variety, dedicated to the memory of Captain STORM.

The slender, acuminate rostrum, which is 4-times as long as wide at its base, usually reaches to the apex of 1st antennular article; in an adult, egg-bearing female from Balikpapan it does only reach to the distal third of the visible part of the article and in the young specimen from Atjeh it also does not extend to the apex of this article. The lateral spines which are also pointed and acuminate, are one-fourth to one-third shorter than the rostrum and are, like the

rostrum, a little setose at the tips. The three spines are sometimes directed straightly and horizontally forward, sometimes they are slightly upturned at the tips, sometimes the lateral spines are a little directed inward and in the male from Atjeh the three spines are moreover slightly turned downward.

Visible part of 1st antennular article in proportion to the length of the 2nd as 4 : 3; 2nd article about one and a half as long as thick at the distal extremity and hardly longer than the 3rd. The visible part of 1st article appears but a little shorter than the 2nd and the 3rd taken together. The stylocerite reaches to the middle or to the distal 3rd part of median article.

Lower spine of basicerite nearly as long as the basal part, not longer, reaching to the extremity of 1st antennular article or just beyond it; spine at the upper angle well-developed, in the adult specimens distinctly shorter than the lateral frontal spines, but in the young specimen from Atjeh reaching as far forward as these spines. Like in the typical *Syn. Bakeri*, the carpocerite, measured at the lower side, appears 3,6-times as long as wide and surpasses the antennular peduncle only with one-fourth or one-fifth the 3rd article. While in the typical species the terminal spine of the scaphocerite extends beyond the carpocerite, in the variety *Stormi* the terminal spine is as long as the carpocerite or sometimes even slightly shorter; scale reaching to the middle or to the distal third part of 3rd antennular article.

Merus of both chelipeds with a spine at the apex of the upper margin, the two other margins unarmed. In the young specimen from Atjeh the measurements of the large chela are: fingers 1; total length 3,7; height 1,35; proportion between length and height 2,75. The palm terminates in a small, conical tooth. Fingers of the smaller chela a little shorter than the palm.

The measurements of the 2nd legs are indicated in Table B, those of the specimens from Balikpapan generally agree with those of the specimens from Atjeh, while the carpal segments are a little more slender, the older the specimens are; I will, however, remark that in the adult specimens from Balikpapan the chela is not longer, but a little shorter than the sum of the three last carpal segments and that in these individuals the 5th segment appears a little longer than the palm.

For the measurements of the 3rd legs see Table C. They apparently prove that the merus and the propodus are longer in proportion to the palm, the older the specimens are. Whereas in the typical *Bakeri* the merus is 3,5-times as long as wide, in this variety the ratio is as 4 : 1. In the young specimen from Atjeh the propodi bear 5 spinules long 0,17—0,19 mm., besides 2 at the distal extremity, in the specimens from the East coast of Borneo, however, 7 spinules long 0,27 mm., besides the 2 apical spines. Measured from the proximal extremity of the anterior margin to the end of the principal hook the dactylus proves, in the young specimen from Atjeh, to be 0,5 mm. long, one-fourth the length of the propodus, and to be 3-times as long as wide at its base, near the propodal articulation. The principal hook, which is twice as long as thick at its base, makes an obtuse angle with the longitudinal axis of the dactylus and is separated by a semicircular curve from the ventral hook, which runs parallel with the principal; the ventral hook is very small and measures, as in the typical species, hardly one-fourth the length of the principal. The dorsal hook is as long as the latter, but only half as thick at its base and the notch between both hooks is sharp.

As is shown in Table A, the telson appears in older specimens a little wider anteriorly with regard to the posterior margin than in the younger ones. The posterior margin is semicircular, rather prominent, the outer angles are spiniform, in adult specimens almost half as long as the length of the posterior margin, measured in the middle line, but in younger individuals the outer angles are shorter. In the adult individuals the spinules of the upper surface are 0,32 mm. long, one-eighth the length of the telson, in the young specimen from Atjeh they are comparatively shorter, measuring one-eleventh the length of the telson. In all the specimens the distances of both pairs of spinules from the posterior margin are in proportion to one another like 5 : 3.

Table A.

	N° 1.	N° 3.
Length of the telson	2,7 mm.	
Width at the base	2,34 mm.	
Width of the posterior margin	1,22 mm.	
Proportion between the length of the telson and the width of the posterior margin	2,21	2,2
Proportion between the width at the base and that of the posterior margin	1,9	1,7
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,66	
Proportion between the distances of both pairs from the posterior margin	1,7	1,7

Table B.

Measurements of 2nd legs in millimeters.

	N° 1.	N° 2.	N° 3.
Length of the merus	3,1	2,2	2
Width of the merus	0,55	0,4	0,35
Proportion between length and width	5,6	5,5	5,7
Length of 1st carpal segment	1,96	1,3	1,18
Width of this segment at the far end	0,4	0,28	0,28
Proportion between length and width	4,9	4,6	4,2
Length of 2nd segment	0,39	0,26	0,22
Width of 2nd segment	0,41	0,295	0,28
Length of 3rd segment	0,44	0,28	0,24
Width of 3rd segment	0,42	0,295	
Length of 4th segment	0,39	0,3	0,22
Width of 4th segment	0,42	0,31	
Length of 5th segment	0,84	0,6	0,5
Width of 5th segment	0,44	0,32	
Length of the chela	1,52	1,2	1,04
Length of the palm	0,68	0,5	0,47
Length of the fingers	0,84	0,7	0,57

Table C.

		N° 1.	N° 2.	N° 3.
Relative measurements of	Merus	2,5	2,45	2,3
	Carpus	1	1	1
	Propodus	2,43	2,36	2,1
Proportion between length and width of the merus		4	4	4
Proportion between length and width of the propodus		6,5	6,66	7

N° 1 adult egg-bearing female, long 21 mm., from Balikpapan; N° 2 younger specimen, long 14 mm. from the same locality; N° 3 specimen, without eggs, long 11 mm. from Atjeh.

The adult, egg-bearing specimens from Balikpapan are 20 and 21 mm. long, the egg-bearing specimen from Atjeh, described in 1897, was only 11 mm. long.

† 20. *Synalpheus Heroni* Cout.

Synalpheus heroni H. Coutière, in: Proc. U. S. National Museum, XXXVI, 1909, p. 42.

Stat. 58. April 25. Anchorage off Seba, Savu, Reef. 1 ova-bearing and 1 younger female.
Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, south of Saleyer. 8 to 10 m. Dead coral; Halimeda; Lithothamnion. 1 male.

The three specimens are very well in accordance with the description. The rostrum in the specimen from Stat. 66 is twice as long as broad at base and reaches to the middle of the visible part of first antennular article; lateral spines rather obtuse, slightly shorter than the rostrum and as long as wide at their base, the three frontal spines are setose at their tips, not curved upward, but directed downward. Second antennular article one and a half as long as thick distally, a little shorter than the visible part of the first, third a little shorter than second; stylocerite extending, at the right side, to the 2nd third part, at the left almost to the middle of second article. Lower spine of basicerite longer than the stylocerite, but not yet reaching the extremity of median antennular article, upper spine turned upward and measuring, in a lateral view, one-third of the lower. The carpocerite extends by the whole length of third article beyond the tip of the antennular peduncle, lateral spine of scaphocerite a little shorter than the carpocerite, though much longer than the antennular peduncle; antennal scale reduced, reaching to the apex of median antennular article.

In the ova-bearing female from Stat. 58 the rostrum reaches almost the end of first antennular article while the lateral spines only extend to the middle of its visible part; the stylocerite extends to the distal third part, the lower spine of the basicerite, however, to the end of second article, whereas the upper spine appears a little shorter than in the other specimen. The carpocerite is a little shorter than in the male from Stat. 66, the terminal spine of the scaphocerite therefore as much surpasses the carpocerite as in Coutière's specimens and the scale likewise somewhat extends beyond the second antennular article. The other specimen from Stat. 58 resembles the female, but the terminal spine of the scaphocerite is as long as the carpocerite and the frontal spines agree with those of the specimen from Stat. 66. The three specimens therefore prove that also this species is somewhat variable as regards the length of the rostrum, the stylocerite, the carpocerite and the spines of the basicerite.

Telson of the specimen from Stat. 66 2,86-times as long as the posterior margin is broad, greatest width twice as broad as the posterior margin; the latter very prominent, its outer angles acute, very short. Spinules of upper surface 0,14—0,16 mm. long, rather far distant from the lateral margins; proportion between the length of the telson and the distance of the anterior pair from the posterior margin 1,95, the anterior pair situated immediately in front of the middle; proportion between the distances of both pairs from the posterior margin 1,7.

Upper margin of the merus of large cheliped truncate, unarmed. In the specimen from Stat. 66 the relative measurements of the large chela are the following: fingers 1; total length 3,15; height 1,25. These numbers closely agree with those mentioned by Coutière: 1 : 3,2; 1,32.

There is an obtuse tubercle at the distal extremity of the palm; the immobile finger bears at the base on the outer side a conical tubercle and a much smaller obtuse tubercle in the middle, and between both tubercles the finger appears distinctly concave, while the inner side of the finger is also excavate or furrowed on its proximal half. In the same specimen from Stat. 66 the relative measurements of the small chela are: fingers 1; total length 2,7; height 1,1. The large chela is 2,6-times as long as the other, according to COUTIÈRE 2,45-times.

In the specimen from Stat. 66 as also in the ova-bearing female from Stat. 58 the merus of second legs is 5-times as long as wide. In the specimen taken at the Station 66 the first segment is 4,8-times longer than thick and a little longer than the sum of the following, in the female the proportion is 4,4 and the first segment appears as long as the sum of the following. *Synalpheus Heroni* is mainly characterized by the shape of the three posterior legs and of their dactyli. In the specimen from Stat. 66 the proportions of the third pair are: carpus 1; merus 1,82; propodus 1,47, those of the fourth pair are: carpus 1; merus 1,84; propodus 1,47. Merus of third legs 2,32-times longer than wide, propodus 3,86-times, the latter with 7 strong propodal spinules, 0,2—0,22 mm. long, besides those at the distal extremity. The length of the dactylus, taken from the proximal extremity to that of the principal hook, is almost one-third the length of the propodus; the dactylus is just half as broad at its base as it is long, the principal hook, which is twice as long as thick at its base, is regularly curved downward and makes an acute angle with the dorsal hook which is hardly shorter, but half as thick at its base; the third, ventral, prominence, finally, is acute and well marked.

The merus of fourth legs, one-tenth shorter than that of the third, is 2,5-times longer than wide, the propodus 3,8-times and armed with 6 spinules that are 0,21 mm. long, besides those at the distal extremity; dactylus similar to that of the third legs. These legs are slightly setose.

Eggs not numerous, 0,7—0,75 mm. long.

In the ova-bearing female from Stat. 58 the fingers of the large chela are of a verdigris colour, the palm yellow. This female is 11,5 mm. long, the specimen from Stat. 66 has the same size.

General distribution: Djibouti (COUTIÈRE).

† 21. *Synalpheus Demani* Borr.

Alpheus triunguiculatus J. G. de Man, in: Archiv für Naturg. 53. Jahrg. 1888, p. 504, Pl. XXII, fig. 1 (Nec PAULSON).

Synalpheus demani L. A. Borradaile, in: A. Willey's Zoological Results. Part IV. Cambridge University Press, September 1899, p. 416.

Synalpheus Brockii G. Nobili, in: Annuario del Museo Zoologico di Napoli, Vol. I, N° 3, 1901, p. 2.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 22 m. and less. Mud, coral and coralsand. 1 male.

Stat. 164. August 20. 1°42'.5 S., 130°47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 1 male and 1 fully adult, ova-bearing female.

Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 male and 1 ova-bearing female.

The female from Stat. 164 is 30 mm. long, larger than those previously described.

Frontal region, antennal and antennular peduncles fully according with Fig. 1 of my quoted paper but the stylocerite reaches to the middle of the second article of the antennular peduncle and, though the carpocerite appears, as in that figure, a little longer than the antennular peduncle, the latter reaches just as far forward as the terminal spine of the scaphocerite. Telson 3,55 mm. long, 2,6-times as long as the posterior margin is broad (1,36 mm.), greatest width anteriorly 2,1-times that of the posterior margin; there is no trace at all of the anterior pair of spinules, but quite rudimentary spinules of the posterior pair, only 0,08 mm. long, are present; they are situated close to the lateral margins, their distance from the posterior margin is one-fourth the length of the telson.

In my description of 1888 the ventral hook of the dactylus of the third legs is said to be half as long as the principal hook, but in this adult specimen it measures two-thirds of the latter.

The male from this Station is 21 mm. long. The rostrum reaches nearly to the end of first antennular article, the orbital spines are a little shorter; the stylocerite extends almost to the middle of second article. The terminal spine of the scaphocerite reaches as far forward as the antennular peduncle and is a little shorter than the carpocerite; lower spine of basicerite as long as first antennular article. Telson 3,25-times as long (2,86 mm.) as its posterior margin is broad (0,88 mm.), the width at base 2,55-times that of the posterior margin; in this specimen traces of the anterior pair of spinules are also visible, situated about as far from the posterior pair as the latter from the posterior margin.

The male from Stat. 315 is 15 mm. long. The length of the telson equals just 3-times its distal margin, while the width at the base is 2,35-times as broad as the posterior margin. The rostrum reaches the end of first antennular article, orbital spines a little shorter. Stylocerite not yet attaining the middle of second article. Dactyli of the third to fifth legs as in the preceding specimens. The female from this Station is 21 mm. long. Rostrum, orbital spines and the peduncles with the scaphocerite as in the male but the stylocerite reaches to the distal third of second antennular article. The telson presents the same form as in the male. Posterior pair of spinules on the upper surface visible, though rudimentary. Eggs not very numerous, those of the female from Stat. 164 1 mm. long, those of the female from Stat. 315 0,7 mm. long.

General distribution: Amboina (DE MAN); Lifu, Loyalty Islands (BORRADAILE).

III. *Paulsoni* group.

† 22. *Synalpheus tumidomanus* (Paulson).

Alpheus tumidomanus Paulson, Recherches sur les Crustacés de la mer Rouge. (en russe). Kiew, 1875, p. 101, Pl. XIII, fig. 2.
Alpheus tumidomanus H. Coutière, in: Proc. U. S. Nat. Museum, XXXVI, 1909, p. 24, fig. 5.

Stat. 209. September 23. South point of Kabaëna-island. Reef. 1 female with eggs.
Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 specimen without eggs.

It is with some doubt that these specimens are referred to PAULSON's species, because they do not fully accord with one another and because the eggs are not "very large", as they are described by COUTIÈRE (l. c.).

The rostrum of the specimen, long 10,5 mm., from Stat. 282 is slender, 7,5-times as long as wide in the middle and extends to the end of first antennular article; lateral spines also pointed, slender, one-fourth shorter than the rostrum, presenting the same form as those of *Syn. acanthitelsonis* (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXII, Fig. 13′), but otherwise as in the quoted figure of *Syn. tumidomanus* in the "Proceedings of the U. S. National Museum".

Antennular peduncle 5-times as long as thick at the apex of the second article; the length of the visible part of the first article and that of the two following are in proportion to one-another as 10 : 7 : 6; the second article is 1,4-times as long as thick at its distal end. As regards the stylocerite and the antennal peduncle with scaphocerite and spines, this specimen resembles the Fig. 5 in the "Proceedings". Carpocerite 4,55-times as long as wide in the middle; in a lateral view the spine at the upper angle of the basicerite proves to measure one-third the length of the lateral or lower spine.

Unfortunately Prof. Coutière does not mention the measurements of the telson and of the legs of *Syn. tumidomanus*, so that it is impossible to decide whether they agree with this specimen or not. The outer angles of the posterior margin of the telson are acute, spiniform, but they are a little shorter than in the quoted figure. The arrangement of the spinules of the upper surface is otherwise than in *Syn. Theophane*. These spinules are namely inserted much nearer to the lateral margins, the anterior pair a little before the middle; the distance between the spinules of the anterior pair, the distance between those of the posterior and the distance between the two pairs are in proportion to one another as 10 : 7 : 5, the spinules of the anterior pair are comparatively farther distant from one another than in *Syn. Theophane*. Merus of large cheliped 2,1-times longer than wide, upper margin with a spiniform tooth at the apex. Relative dimensions of large chela: fingers 1; total length 4,75; height 1,7, this chela being 2,8-times longer than high. The fingers are much shorter with regard to the total length than in the species from the Persian Gulf which was referred by Nobili to *Syn. tumidomanus*, in: Bull. Scientif. de la France et de la Belgique, XL, 1906, p. 27. The anterior margin of the palm is almost unarmed, presenting only a small, obtuse tubercle. The small cheliped and the 2nd legs are missing. For the measurements of the third and fourth legs I refer to the Tables B and C. In both legs the propodus bears 8 spinules; those of the third legs are 0,15—0,16 mm. long, those of the fourth are a little shorter. Measured from the base of the anterior margin to the tip of the ventral hook, the dactylus proves to measure one-fifth the length of the propodus, but it shows another form than that of *Syn. Theophane*. The dactylus, indeed, has a less slender form, being in the third legs 2,6-times, in the fourth 2,5-times as long as broad; the ventral hook, the length of which is in proportion to the width at its base as 5 : 3, does not directly continue the posterior margin of the dactylus, but rejoins it by a concave curve of short radius and the arcuate, anterior margin of this hook runs nearly perpendicularly to the posterior margin of the dactylus; the dorsal hook is a little less broad at its base, but one-fifth longer than the other, the two hooks are divergent, but the narrow, inner angle of the notch is rounded, concave.

In the other specimen which is 13,5 mm. long, the three frontal spines closely

resemble those of the figure in the "Proceedings"; the rostrum, 6-times as long as wide in the middle, extends to the distal fourth of the visible part of basal antennular article and the orbital spines are but one-eighth shorter than the rostrum. The carpocerite is perhaps a little less slender than in the other specimen, the two are not equal, the right carpocerite being 4-times, the other 4,4-times as long as wide in the middle; for the rest the antennal region accords with that of the specimen from Stat. 282. The telson fully resembles that of the other specimen. The first pair of legs are missing. Merus of second legs 4,8-times as long as wide; first segment (1,095 mm.) of the carpus not slender, 3,75-times as long as thick distally, hardly shorter than the sum (1,168 mm.) of the four following, the proportion being 1,07; chela 1,022 mm. long, slightly shorter than the first segment; the fingers in proportion to the palm as 4 : 3.

The following legs show a somewhat stouter form than those of the specimen from Stat. 282 and the propodus of the third pair bears only 6 spinules, instead of 8, but of the same length; those of the fourth pair 7. The dactyli of the third legs are 2,4-times as long as wide at the base and measure about one-fifth the length of the propodus; the ventral hook is just one and a half as long as wide at base, the dorsal hook is almost twice as long as the other and a little less broad at its base, but for the rest the form of the dactyli is the same.

Ova rather numerous, 0,73 mm. long.

The slight differences between both specimens are probably of a local or individual character.

Table A.

	N° 1.	N° 2.
Proportion between length of telson and width of the posterior margin	2,52	2,5
Proportion between the greatest width and that of the posterior margin	2	1,95
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,84	1,92
Proportion between the distances of both pairs of spinules from the posterior margin	1,85	1,8

Table B.

		N° 1.	N° 2.
Relative dimensions of Merus	of the third legs	2,21	2,45
Relative dimensions of Carpus	of the third legs	1	1
Relative dimensions of Propodus	of the third legs	2,1	2,22
Proportion between the length of the merus and that of the propodus	of the third legs	1,07	1,1
Proportion between the length and the width of the merus	of the third legs	3,65	4,2
Proportion between the length and the width of the propodus	of the third legs	5,58	6,4

Table C.

		N° 1.	N° 2.
Relative dimensions of Merus	of the fourth legs	2,01	2,34
Relative dimensions of Carpus	of the fourth legs	1	1
Relative dimensions of Propodus	of the fourth legs	2,06	2,3
Proportion between the length of the merus and that of the propodus	of the fourth legs	1	1,02
Proportion between the length and the width of the merus	of the fourth legs	3,6	4,1
Proportion between the length and the width of the propodus	of the fourth legs	5,56	6,45

N° 1 female from Stat. 209; N° 2 specimen from Stat. 282.

General distribution: Red Sea (Paulson).

† 23. *Synalpheus Theophane* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 292.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 egg-bearing female.
Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar-)island. Reef. 1 egg-bearing female.
Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 3 specimens, 2 of which with eggs.

A new species of the *Paulsoni* group, closely related to *Syn. tumidomanus* (Paulson) and to *Syn. hululensis* Cout.

Rostrum in the female from Stat. 78 3-times as long as wide at its base, reaching but a little beyond the middle of the visible part of first antennular article, of an elongate triangular form; lateral spines acuminate, but a little shorter than the rostrum, from which they are separated by notches, similar to those of *Syn. tumidomanus* (vide: COUTIÈRE in: Proc. U. S. Nat. Mus. XXXVI, 1909, p. 24, Fig. 5). In the female from Stat. 144, long 11,5 mm., the rostrum appears a little more slender, almost 4-times as long as wide at its base and it reaches to the distal fifth of the visible part of first antennular article; the orbital spines are comparatively much shorter than in the preceding specimen, being one-fourth shorter than the rostrum. In the largest specimen from Stat. 282, a female with eggs, 13,5 mm. long, the rostrum is 4-times as long as wide at its base and reaches almost to the end of basal article, while the lateral spines hardly reach beyond the middle. The three spines project straightly forward and are not curved upward at their tips.

Antennular peduncle 4-times as long as wide (at the distal extremity of the second article); median article a little longer than wide distally and a little more than half as long as the visible part of basal article; third article as long or hardly shorter than second. The length of the visible part of first article and that of the two following are in the proportion as 5 : 3 : 3. In the quoted figure of *Syn. tumidomanus* (Paulson) the third article appears distinctly shorter than the second, but the second hardly shorter than the visible part of the first. The stylocerite extends to the distal third of median article. Carpocerite resembling that of *Syn. tumidomanus* and *Syn. hululensis*, 4,3—4,5-times as long as wide and surpassing the antennular peduncle by one-third the distal article. Terminal spine of scaphocerite not or hardly curved inward, always reaching for a short distance beyond the carpocerite and projecting by one-third of its length beyond the apex of the antennal scale which almost reaches to the tip of the antennular peduncle. Lateral spine of the basicerite a little longer than the outer margin of the basal part, clearly shorter than the stylocerite, and reaching only to the 2nd fourth part of median antennular article; upper angle with a well developed spine, which is directed obliquely upward, its length being one-fourth the length of the lateral or inferior spine.

The measurements of the telson are indicated in Table A. The posterior margin is more prominent than in *Syn. tumidomanus*, almost semicircular, the outer angles are spiniform, as in this species, but shorter, only half as long as the outer spinules of the posterior margin; the longer, inner spinules of the posterior margin are just half as long as the distance between the spiniform, outer angles. Quite characteristic is the arrangement of the spinules on the upper surface, that are of moderate length, those of the anterior pair 0,175 mm. long, those of the

posterior 0,19 mm.; the anterior pair is situated before the middle, about one and a half as far distant from the posterior margin as from the base, the posterior pair just as far distant from the distal extremity of the telson as the distance between the postero-lateral spiniform angles is wide. According to the quoted figure of *Syn. tumidomanus*, however, in this species the posterior pair is situated much more backward, its distance from the posterior extremity being only half as long as the width of the posterior margin. The two pairs of spinules are rather far distant from the lateral margins and the spinules of the anterior pair are but a little farther distant from one another than those of the posterior, the distance between the two anterior spinules being in proportion to the distance between the posterior as 6 : 5; the distance, finally, between the two anterior spinules is in proportion to the distance between the two pairs as 7 : 4. The four spinules appear therefore to be inserted at the angles almost of a rectangle.

The large cheliped is missing in all the specimens. Merus of small cheliped 2,54-times as long as wide, upper margin terminating in a small, spiniform tooth. Relative dimensions of the small chela: fingers 1; total length 3,2; height 1,1. The fingers are comparatively shorter than those of the small chela of *Syn. hululensis*.

Merus of second legs 5,3-times longer than wide; first segment of the carpus 5,6-times longer than thick at its distal extremity, clearly longer than the sum of the four following, viz. 1,23-times; chela as long as the carpus, exclusive the first segment, fingers one-fifth longer than the palm.

For the measurements of third pair I refer to the Table B: these legs apparently much resemble those of *Syn. hululensis* Cout. In the specimens from the Stations 144 and 282 the propodus bears ten spinules, in that from Stat. 78 eight; these spinules are 0,15—0,19 mm. long. The dactylus, similar to that of *Syn. hululensis*, appears, when measured from the proximal end of the anterior margin to the extremity of the ventral hook, to be 3-times as long as wide at its base and measures one-fifth the propodus; the dorsal hook is twice or almost twice as long as the ventral and only very slightly broader at its base, while the notch between both hooks is rounded internally.

Eggs rather numerous, 0,75—0,8 mm. long. The largest specimens, egg-bearing females, are 13,5 mm. long, but one of the egg-bearing females from Stat. 282 measures only 9,5 mm.

Table A.

	N° 1.	N° 2.	N° 3.
Proportion between length of telson and width of the posterior margin	2,6	2,85	2,7
Proportion between the greatest width and that of the posterior margin	1,9	2	1,9
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,7	1,8	1,63
Proportion between the distances of both pairs of spinules from the posterior margin	1,51	1,6	1,58

Table B.

		N° 1.	N° 2.	N° 3.
Relative dimensions of	Merus	2,34	2,4	2,38
	Carpus	1	1	1
	Propodus	2,1	2,2	2,1
Proportion between the length of the merus and that of the propodus	of the third legs	1,1	1,1	1,1
Proportion between length and width of the merus		4	4,2	4,6
Proportion between length and width of the propodus		6,2	6,6	6,4

† 24. *Synalpheus hastilicrassus* Cout.

Synalpheus hastilicrassus H. Coutière, Alpheidæ Mald. and Laccad. Archip. 1905, p. 875, Pl. LXXII, fig. 12.

Stat. 91. June 22. Muaras-reef, inner side; near east coast of Borneo. 2 specimens without chelipeds, one of which with eggs.
Stat. 115. July 9/11. East side of Pajunga Island, Kwandang-bay. Reef. 1 female with eggs.
Stat. 164. August. 20. 1° 42′.5 S., 130° 47′.5 E. Between Misool and New-Guinea. 32 m. Sand, small stones and shells. 1 young specimen.
Stat. 250. December 6/7. Kur-island. 27 m. Coral and Lithothamnion. 1 young specimen.
Stat. 260. December 16 and 18. 5° 36′.5 S., 132° 55′.2 E. 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 1 ova-bearing female.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 male and 2 young specimens.
Stat. 285. January 18. 8° 39′.1 S., 127° 4′.4 E. Anchorage South coast of Timor. 34 m. Lithothamnion. 1 ova-bearing female.
Stat. 299. January 27/29. 10° 52′.4 S., 123° 1′.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Depth up to 36 m. Coral and Lithothamnion. 1 specimen, with a parasite between the pleopods.

The specimens from Stat. 282 fully agree with the description and with the figures of Coutière. The largest specimen is a male, long 10 mm. Antennal region as in Fig. 12, but the orbital spines project straightly forward. Telson resembling Fig. 12*d*, just twice as long as the distance between the postero-lateral spines, proportion between that distance and the greatest width 1,7. Spinules of the anterior pair 0,19 mm. long, those of the posterior 0,23 mm.; the anterior pair before the middle, proportion between the length of the telson and the distance of the anterior pair from the posterior margin 1,55, proportion between the distances of both pairs from the posterior margin 1,6. The postero-lateral spines are barely longer than the median part of the posterior margin and the long, inner spinules are hardly more than half as long as the distance between the spiniform outer angles.

Merus of large cheliped 2,1-times, that of the smaller just 3-times longer than wide and in either of them the upper margin is obtuse, unarmed at apex. Relative proportions of the large chela: fingers 1; total length 4,2; height 1,5. This chela is 3-times as long as the other, the relative dimensions of which are: fingers 1; total length 3,1; height 1,12. Merus of second legs 6-times as long as wide. The first carpal segment, 4,8-times longer than thick, is a little longer than the sum of the four following that, taken together, appear as long as the chela; the second article is a little longer than the third or the fourth that are equal, fingers somewhat more than one and a half as long as the palm.

Relative dimensions of the third legs: merus 2,72; carpus 1; propodus 2,1. Merus 4,1-times longer than wide and 1,27-times longer than the propodus which is slender, 6-times as long as wide and armed with 11 spinules, that are 0,1 mm. long. Dactylus one-sixth the length of the propodus, 2,5-times longer than wide, when measured to the extremity of the ventral hook; ventral hook one-fifth the whole length of the dactylus, dorsal hook but a little longer and thicker than the other.

The ova-bearing female from Stat. 115, long 10,5 mm., does not fully agree with the

preceding specimen as regards the measurements, but the differences are perhaps of a local character. The ova, few in number, are large, 1 mm. long. The stylocerite does not surpass the basal antennular article and appears therefore a little shorter than the lower spine of the basicerite. Telson longer, its length equals 2,5-times the distance between the postero-lateral spines and this distance is just half as large as the greatest width; the arrangement of the spinules is the same.

Merus of small cheliped 3-times longer than wide, its upper margin, like that of the large cheliped, acute at apex, though a proper tooth is not developed. Relative dimensions of small chela: fingers 1; total length 2,9; height 0,93.

Second legs stouter than in the preceding specimen. Merus 5,2-times longer than wide. First carpal segment 3,57-times longer than thick, a little shorter than the sum of the four following, which, taken together, are a little shorter than the chela; the 2nd segment is slightly longer than the 3rd or the 4th that are equal, fingers hardly one and a half as long as the palm.

The relative dimensions of the third legs are: merus 2,7; carpus 1; propodus 2. Merus 4,4-times longer than wide and 1,35-times as long as the propodus; the latter is 5,7-times longer than wide and armed with 11 spinules, long 0,1 mm. Dactylus somewhat more than one-fifth of the propodus and 2,76-times longer than wide; dorsal hook one and a half as long and a little broader at the base than the other.

In most specimens of the other stations the large cheliped is missing.

Remarks. This species is apparently closely related to *Syn. acanthitelsonis* and one should be inclined to consider it as a variety, especially because in some individuals of *Syn. acanthitelsonis* from Stat. 273 the upper angle of the basicerite is unarmed, while in other specimens, referred to *Syn. hastilicrassus*, the upper margin of the merus of both chelipeds is often acute, as e. g. in the female which has been described. The form of the telson is also variable.

General distribution: Maldive and Laccadive Archipelagoes.

†24*a*. *Synalpheus hastilicrassus* Cout. var.?

Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 specimen, young.

Stat. 310. February 12. 8° 30′ S., 119° 7′.5 E. Sapeh Strait. 73 m. Sand with few pieces of dead coral. 4 specimens, 1 of which with eggs.

The specimen from Stat. 305, which is 8 mm. long, probably also belongs to *Syn. hastilicrassus*, but it is here described separately, on account of the form of the large chela. In the male of *Syn. hastilicrassus* from Stat. 282 the relative dimensions of the large chela are: fingers 1; total length 4,2; height 1,5. In the specimen from Stat. 305, however, the dimensions are: fingers 1; total length 2,9; height 0,96. The fingers are, in this specimen, not only much longer with regard to the length of the chela, but they show a more slender form than in the specimens referred to *Syn. hastilicrassus*. There is a subacute tubercle on the anterior margin of the palm.

The frontal and the antennal regions are typical and the measurements of the telson agree with those of the female from Stat. 115 (p. 264).

Merus of second legs 6-times longer than wide as in the male from Stat. 282, but the first segment of the carpus, which is almost as long as the sum of the four following and as long as the chela, is 4-times longer than thick. Relative dimensions of third legs: merus 2,8; carpus 1; propodus 2,3. Merus 4,5-times longer than wide, propodus 7-times, the latter with 9 spinulès, long 0,066—0,117 mm. The dactylus that measures somewhat more than one-sixth of the propodus, has a more slender shape than in the typical specimen from Stat. 282, being 2,9-times longer than wide; the ventral hook measures one-sixth the length of the dactylus, the dorsal hook is one and a half as long as the other and almost one and a half as broad at its base, while the angle between both hooks, which in the typical male from Stat. 282 is rounded, appears in this specimen rather sharp.

The large chela of a specimen long 10 mm. from Stat. 310 shows the following dimensions: fingers 1; total length 3,45; height 1,13; these dimensions are intermediate between those of the specimen from Stat. 305 and those of the typical male from Stat. 282. Second legs as in the specimen from Stat. 305, but the first segment of the carpus is 4,4-times longer than thick: an intermediate number again.

Relative dimensions of the third legs: merus 2,74; carpus 1; propodus 2,3. Merus 4,2-times longer than wide, propodus 6,5-times; dactylus like in the specimen from Stat. 305, but the dorsal hook is hardly broader at its base than the other.

† 25. *Synalpheus acanthitelsonis* Cout.

Synalpheus acanthitelsonis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 875, Pl. LXXII, fig. 13.

Stat. 164. August 20. 1°42′.5 S., 130°47′.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 7 specimens, none of which with eggs.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 4 specimens, 3 of which with eggs.

These specimens agree very well with the original description. In one of the specimens from Stat. 164, which is 11,5 mm. long, while the others are nearly of the same size, the frontal spines and the antennal region agree with Fig. 13′ (Coutière, l. c.), but the orbital spines, though their form is the same, are directed inward, as in Fig. 13. The slender rostrum, 5-times as long as wide, reaches the middle of median antennular article; the visible part of first article is one and a half as long as the second and the second a little longer than the third; the stylocerite extends to the 2nd third part of median article. The lower spine of the basicerite is as long as the first article and the scale of the scaphocerite reaches to the middle of third article. Telson 2,1-times longer than the distance between the outer spiniform angles of the posterior margin is broad; this margin agrees with Fig. 13*c* (l. c.), but the inner spinules are 0,32 mm. long, much longer than the spiniform angles, whereas in the original description the latter are described as being longer than those spinules. Proportion between the greatest width and the distance between the postero-lateral spiniform angles 1,86. The spinules of the

upper surface are large, 0,25 mm. long; the anterior pair is situated before the middle, proportion between the length of the telson and the distance of the anterior pair from the posterior margin 1,64, proportion between the distances of either pair from the posterior margin 1,83.

Merus of the small cheliped (the other is missing) 2,8-times as long as wide, with a small acute tooth at the apex of the upper margin as in Fig. 13*b*; the small chela shows the following dimensions: fingers 1; total length 3,1; height 1,04.

Merus of second legs 6-times longer than wide. First carpal segment 5-times longer than thick, a little longer than the sum of the following, the three following segments equal; chela a little shorter than the sum of the 2nd—5th segments, fingers one and a half as long as the palm.

The relative dimensions of the third legs are: merus 2,66; carpus 1; propodus 2,34. Proportion between the length of the merus and that of the propodus 1,14. Merus 4,55-times, propodus 6,3-times longer than wide, the propodus slender, slightly narrowing distally and armed with 11 rather short spinules, that are 0,1—0,116 mm. long. Measured from the proximal extremity of the anterior margin to the extremity of the ventral hook, the dactylus proves to measure almost one-fifth of the propodus and it much resembles that of *Syn. hastilicrassus*, but the dorsal hook is one and a half as long and a little less thick at its base than the ventral hook. These legs are slightly setose.

In other specimens from this station the frontal spines more closely resemble Fig. 13 of the original description, but in all these specimens the internal spinules of the posterior margin of the telson are much longer than the spiniform external angles.

One of the females from Stat. 273 is 11 mm. long; ova small, 0,66—0,73 mm. long. The rostrum is slender, reaching almost to the middle of median antennular article; lateral spines and antennal region as in Fig. 13′, (l. c.). Telson 2,3-times longer than the distance between the spiniform outer angles of the posterior margin, proportion between this distance and the greatest width 1,8; the internal spinules of the posterior margin are considerably longer than the spiniform angles. The spinules of the upper surface are 0,25 mm. long, proportion between the length of the telson and the distance of the anterior pair from the posterior margin 1,7; proportion between the distances of either pair from the posterior margin 1,6.

Merus of large cheliped twice as long as wide, with a spiniform tooth at the apex of the upper margin as in Fig. 13*a*. Proportions of the large chela: fingers 1; total length 3,6; height 1,3. Proportion between the length of the large chela and that of the smaller 2,46. Merus of small cheliped 2,56-times longer than wide, with an acute tooth at the apex of the upper margin; proportions of the small chela: fingers 1; total length 2,8; height 0,94. Second legs as in the preceding specimen, but the merus is 6,4-times longer than wide and the second segment is a little smaller than the third or the fourth which are equal.

The proportions of the third pair are: merus 2,75; carpus 1; propodus 2,5. Proportion between the length of the merus and that of the propodus 1,1. Merus 4,4-times, propodus 6,25-times longer than wide, the latter with 9 spinules long 0,095—0,117 mm. Dactylus almost one-fifth of the propodus.

In the three other specimens from this station the basicerite is unarmed above, as

in *Syn. hastilicrassus*, though the upper angle is acute. One of them, a female long 11 mm., bears ova that are 0,88 mm. long. The telson agrees with the preceding specimen, but the two pairs of spinules are situated farther from one another, the proportion between the distances of either pair from the posterior margin being 1,83, instead of 1,6.

Merus of large cheliped 2,4-times, that of the other 2,76-times longer than wide and in each merus the upper margin ends in a small acute tooth. Proportions of the large chela: fingers 1; total length 4,2; height 1,56; proportions of the small chela: fingers 1; total length 2,62; height 0,92. Proportion between the length of both chelae 2,5.

Relative dimensions of the third legs: merus 2,8; carpus 1; propodus 2,3, the latter with 11 spinules, long 0,1 mm.; proportion between the length of the merus and that of the propodus 1,2. Dactylus one-fifth the length of the propodus.

General distribution: Maldive and Laccadive Archipelagoes.

† 26. *Synalpheus ancistrorhynchus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 124.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 2 males.

A new species of the *Paulsoni* group, related to *Syn. acanthitelsonis* Cout.

Rostrum short, twice as long as wide at its base and reaching to the middle of the visible part of first antennular article; the frontal spines, which are separated from the rostrum by intervals rounded at their base, are slightly shorter and the three spines are curved upward at their tips, like barbed hooks (ἄγκιστρον). The obtuse, rostral carina is continued to a little behind the corneae, disappearing here gradually.

Antennular peduncle 4,3-times longer than thick at the distal end of median article; median article a little longer than thick, measuring three-fourths of the length of the visible part of basal article, third article a little shorter than the second. Stylocerite acuminate, reaching to the 2nd third part of median article. Lower spine of basicerite just as long as the stylocerite, not shorter, in the younger specimen even slightly longer. The carpocerite, 4,3-times longer than wide, surpasses the antennular peduncle by two-thirds the length of the third article, upper spine of the basicerite small, curved upward and outward. The terminal spine of the scaphocerite, the outer margin of which is slightly concave, surpasses the antennular peduncle, but is shorter than the carpocerite and exceeds by half its length the narrow scale that hardly reaches the end of median article.

All the abdominal pleura terminate in a triangular point, that is rather acute in the 3rd—5th, less so in the others; the anterior angle of the third is also acute.

The telson much resembles that of *Syn. acanthitelsonis* Cout., but it narrows more considerably backward, the length being 2,42-times as long as the width of the posterior margin and the proportion between the latter and the greatest width being 2,1; the posterior angles are prolonged to triangular spines, which project by half their length beyond the median part of the margin. The two pairs of spinules of the posterior margin are nearly of

equal length, the inner just half as long as the distance between the spiniform angles, the outer but a little shorter and both pairs somewhat project beyond the postero-lateral spines. The spinules of the upper surface are large, those of the anterior pair are just as long as the internal spinules of the posterior margin, those of the posterior are a little longer; the anterior are situated far before the middle, the proportion between the length of the telson and their distance from the posterior margin being 1,6 and the proportion between the distances of either pair from the posterior margin is 1,93. In the other younger specimen the telson is still more elongate, the proportion between its length and the distance of the postero-lateral spines being 2,8, while the proportion between the latter distance and the width at the base is 2,3; the proportion between the length of the telson and the distance of the anterior pair from the posterior margin is 1,7, while the proportion between the distances of either pair from the end of the telson is 1,65.

Merus of large cheliped, in the larger specimen, 1,88-times longer than wide, with a spiniform tooth at the apex of the upper margin. The relative dimensions of the large chela are: fingers 1; total length 3,74; height 1,52; proportion between the total length and the height being 2,45. At the supero-internal side the anterior margin of the palm ends in a conical, though rather obtuse tubercle.

Merus of small cheliped 3-times longer than wide, upper margin truncate and unarmed at apex. The relative dimensions of the small chela are: fingers 1; total length 2,54; height 0,81; proportion between the total length and the height 3,1. Larger chela 2,6-times as long as the other.

In the second pair the merus is 4,5-times longer than wide. First segment, like the following, also of a stout shape, 3-times longer than thick and somewhat shorter than the sum of the four following, that, taken together, are 1,3-times as long as the first segment; the chela, the fingers of which are one and a half as long as the palm, appears hardly shorter than the sum of the four last segments. The second segment is slightly shorter than the third and than the fourth that are equal and the fifth segment is one-third longer than wide.

Following legs also of a rather stout shape. The relative dimensions of the third legs, which, except the dactylus, much resemble those of *Syn. pachymeris* Cout., are: merus 2,8; carpus 1; propodus 2. The merus, which is 3,43-times longer than wide, bears 3 small and feeble, movable spinules, long 0,09—0,1 mm., on the distal third of the posterior margin, a quite remarkable character, because in the species of the *Paulsoni* group the merus appears as a rule unarmed. The propodus, 4,65-times longer than wide, narrows distally as in *Syn. pachymeris* Cout. and is armed with 8 spinules, that are 0,08—0,11 mm. long. Measured from the extremity of the ventral hook to the proximal end of the anterior border, the dactylus appears to measure one-sixth the length of the propodus and to be just twice as long as broad at the base. The dactylus much resembles that of *Syn. acanthitelsonis*. The ventral hook, that measures one-sixth the total length of the dactylus, is one and a half as long as broad at its base, its posterior margin rejoins by a concave curve the posterior margin of the dactylus, whereas the S-like shaped anterior runs nearly perpendicularly to the latter; the tapering and curved, dorsal hook is twice as long as the other and one and

a half as wide at its base as the ventral hook. The interval between both hooks is rounded at the base and, as in *Syn. acanthitelsonis*, a fissure runs inward, soon dividing itself in two other ones, the anterior of which runs obliquely towards the curved anterior margin of the joint. One observes in the interior of the ventral hook also some narrow bands or stripes that curve backward, just as in *Syn. acanthitelsonis*. In *Syn. acanthitelsonis*, however, the ventral hook is longer with regard to the dorsal and both hooks are equally broad at their base. These legs are slightly setose.

Relative proportions of the fifth legs: merus 1,5; carpus 1; propodus 1,43. The merus is 3,6-times, the propodus 5,55-times longer than wide and the dactylus measures a little more than one-sixth of the propodus.

The larger specimen is almost 11 mm. long, the other 9,5 mm.

† 27. *Synalpheus Paulsoni* Nob. var. *Rameswarensis* Cout.

Alpheus sp. J. G. de Man, in: Zoolog. Jahrb. Abth. f. Syst. IX, 1897, p. 738, Fig. 62*a* and 62*aa*.
Synalpheus Paulsoni Rameswarensis H. Coutière, in: Bull. Soc. Philom. Paris, (9) T. XI, 1908, p. 11.

A new examination of one of the 6 specimens from Atjeh, described by me (l. c.) as *Alpheus* sp., which specimen, 13 mm. long, belongs to my private collection, proved it to appertain to *Syn. Paulsoni* Nob. var. *Rameswarensis*, a variety which occurs at Rameswaram, near Ceylon. In the variety *Rameswarensis* the terminal spine of the scaphocerite should, as in the typical *Syn. Paulsoni*, be longer than the carpocerite, in the Atjeh specimens, however, the terminal spine extends as far forward as the carpocerite. The specimen which is lying before me, accords with the quoted description, but the following measurements will still be welcome.

The carpocerite is 3,4-times as long as wide.

Measurements of the large chela: fingers 1; chela 3,3; height 1,1. Chela 3-times as long as high, palm terminating in a small, conical tooth that is directed straightly forward. Merus unarmed.

Measurements of third legs: merus 2,4; carpus 1; propodus 2. Merus 3,9-times as long as wide, propodus 6-times, with 6 spinules on the posterior margin besides 2 at the distal extremity; these spinules are 0,16—0,2 mm. long.

Length of the telson 2,24-times as long as the posterior margin is wide; outer angles of the latter spinous, but only reaching to midway the length of the posterior margin. Proportion between the width at the base and that of the posterior margin 1,8. Spinules of the upper surface 0,24 mm. long, one-eighth the length of the telson. Anterior pair of spinules nearly in the middle, posterior pair a little farther distant from the posterior margin as from the anterior pair; distances of both pairs from the posterior margin in proportion to one another as 1 : 0,58.

This form was not collected by the "Siboga".

† 28. *Synalpheus gracilirostris* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 291.

Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 2 specimens, 1 of which is ova-bearing.

A new species of small size of the *Paulsoni* group, related to *Syn. hululensis* Cout.

The ova-bearing specimen possesses all its legs and will therefore be described as the type, the other has lost the large cheliped.

Rostrum slender, 8 or 9-times as long as wide in the middle and reaching to the 2nd third part of median antennular article; the rostrum which distinctly widens at its base, the width being here about one-third the length, is directed a little obliquely downward, while the lateral spines project horizontally forward. Lateral spines also slender, acuminate like the rostrum, but notably, viz. two-fifths, shorter, extending to the distal third of the visible part of basal article; the tips of the lateral spines are turned inward, their outer margin is concave at the base, while the notches by which they are separated from the rostrum, resemble those of *Syn. hululensis*, the anterior wall of the frontal region being visible from above.

Antennular peduncle 4-times as long as wide at the distal extremity of the second article; the relative proportions of the visible part of the first article and of the two following are as 8 : 5 : 5, the basal article being a little more than one and a half as long as the second, the second just as long as the third and slightly longer than thick distally. Stylocerite acuminate, extending to the distal 4th part of median article.

Lateral spine of basicerite rather stout, much shorter than the stylocerite, but exactly as long as the outer margin of the basal portion and reaching as far forward as the first antennular article; upper angle subacute, but not spiniform. Carpocerite 3,75-times — in the other specimen 3,8-times — longer than wide, surpassing the antennular peduncle only by one-fifth or one-sixth of the third article, — in the other specimen a little more; the terminal spine of the scaphocerite is slightly curved inward, distinctly exceeds the carpocerite and surpasses by one-third of its length the tip of the scale, that reaches a little beyond the middle of third antennular article.

Telson 3-times — in the other specimen 2,34-times — as long as the posterior margin is wide, greatest width twice as broad as the latter. The spinules of the upper surface are small, those of the anterior pair 0,13 mm. long, those of the posterior 0,15 mm. and situated near the lateral margins; the proportion between the length of the telson and the distance of the anterior pair from the posterior margin is 1,82, the proportion between the distances of both pairs from the posterior margin 1,6, while these numbers are, in the other specimen, respectively 1,77 and 1,67. Postero-lateral angles acute, like in *Syn. hululensis*, not spiniform, very short; median part of the posterior margin more prominent than in this species, almost semicircular. In both specimens the spinules of the posterior margin are lost. Merus of larger cheliped 2,1-times, that of the smaller 2,76-times as long as wide, in both meri the upper margin terminates in a small spiniform tooth at the apex; the merus of the larger cheliped is 1,14-times as long as the other. Relative dimensions of the larger chela: fingers 1; total length 3,87; height 1,35, this chela being 2,87-times as long as high. The anterior margin terminates in a small, rather obtuse tubercle, which does even not exist in the smaller chela, the relative dimensions of which are: fingers 1; total length 3,25; height 1, the tapering fingers being shorter than in *Syn. hululensis*. Larger chela 2,4-times as long as the other, in *Syn. hululensis* 3-times.

The second legs much resemble those of *Syn. hululensis*. The first segment, 5,2-times as long as thick at the distal extremity, appears as long as the sum of the four following and one-fifth longer than the chela, the fingers of which are one-third longer than the palm; the second, the third and the fourth segment are equal.

Relative dimensions of third legs: merus 2,4; carpus 1; propodus 2,23 — in the other specimen respectively 2,5; 1; 2,2. Merus 4,6-times, in the other specimen 5-times as long as wide; propodus 7,1-, respectively 7-times as long as wide, with 9 spinules long 0,09—0,12 mm. Measured from the proximal end of the anterior margin to the tip of the ventral hook, the dactylus appears to measure a little less than one-fifth of the propodus. The dactylus resembles that of *Syn. hululensis*; it is 2,8-times as long as wide near the articulation, ventral hook one and a half as long as wide at its base, dorsal hook nearly just as broad at its base, but a little more than one and a half as long as the ventral hook; notch between both hooks obtuse. In the ova-bearing female the merus of the third legs is 1,07-times, in the other specimen 1,15-times as long as the propodus.

Ova few in number, rather large, 0,6—0,75 mm. long. Length of the egg-bearing female 10 mm., the other specimen is a little younger.

Remarks. This species seems to approach also to *Syn. Mac-Cullochi* Cout. from Australia, but it differs by the less stout shape of the carpocerite, by the lateral spine of the basicerite being not longer than the basal portion and perhaps by other features.

† 29. *Synalpheus hilarulus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 290.

Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 egg-bearing female.

A species of the *Paulsoni* group, apparently closely related to *Syn. Paulsoni Rameswarensis* Cout. and to *Syn. Paulsoni liminaris* Cout., but which is described as new, because I do not succeed in identifying it with certainty with any of these forms. Rostrum 3-times longer than wide at its base, not curved upward at the tip and reaching almost to the apex of first antennular article; lateral spines one-fourth shorter than the rostrum, with the pointed, acuminate tips slightly directed inward and separated from the rostrum by notches that are narrowing backward, like those of *Syn. Paulsoni* Nob. (vide H. COUTIÈRE, in: Proc. U. S. Nation. Mus. XXXVI, 1909, p. 23, Fig. 2). Antennular peduncle stout, 3,66-times longer than wide at the distal extremity of median article. Measured in the middle of the upper surface, the visible part of the basal article appears almost one and a half as long as the second, which is hardly longer than wide at the apex; third article almost as long as the second, very little shorter. Stylocerite acuminate, extending almost to the end of second article, with both the outer and the inner margin straight.

Lateral or lower spine of the basicerite just as long as the outer margin of the basal portion, much shorter than the stylocerite and hardly extending beyond the basal antennular article. Carpocerite 3,3-3,5-times longer than wide in the middle, measured on the lower side and exceeding the antennular peduncle by two-thirds the third article; outer margin of scaphocerite

almost straight, the terminal spine which is not curved inward and which almost reaches to the tip of the carpocerite, exceeds by one-third of its length the rounded tip of the well developed scale, which is hardly shorter than the antennular peduncle. Upper spine of basicerite very small, 0,13 mm. long.

The length of the telson equals 2,44-times the width of the posterior margin, proportion between the width at base and that of the posterior margin 1,9. The spinules of the upper surface are small, those of the posterior pair are 0,2 mm. long; the anterior pair is situated just midway between the base and the posterior margin, almost as far distant from the lateral margins as from the median line of the telson, proportion between the distances of both pairs from the posterior margin 1,8. Posterior margin a little prominent, outer angles accented, but not spinous, very short; internal longer spinules about half as long as the width of the posterior margin.

The merus of the larger cheliped is just as long as that of the smaller and in both meri the upper margin terminates in a small, acute tooth; the former is 2,1-times, the latter 2,3-times as long as wide. Measurements of the larger chela: fingers 1; total length 4,6; height 1,6; this chela is 2,82-times longer than high and 2,46-times as long as the smaller chela. Anterior margin of the palm terminating in a small, acute spine, which is slightly directed downward.

The small chela has, as proportions: fingers 1; total length 2,44; height 0,81, this chela being just 3-times longer than high; palm unarmed, fingers tapering. Merus of second legs 5-times as long as wide. The first segment of the carpus is 4,6-times as long as thick and as long as the sum of the four following; it is slightly longer than the chela, the fingers of which are one-sixth longer than the palm; the third segment appears a little larger than the second or the fourth.

The third legs show the following relative dimensions: merus 2,23; carpus 1; propodus 2,05. The merus is unarmed, 3,66-times longer than wide and 1,1-times longer than the propodus; propodus 6-times longer than wide, slightly narrowing distally and armed with 6 spinules, that are 0,15—0,22 mm. long. Measured from the base of the anterior margin to the extremity of the ventral hook, the dactylus proves to measure one-fourth of the propodus and to be 3-times as long as wide near the articulation, being of a rather slender form; the ventral hook which makes a very obtuse angle with the posterior margin of the dactylus, is one and a half as long as broad near the articulation, its posterior margin is straight, the anterior arcuate. The dorsal hook is twice as long, but just as broad at its base as the other, a little more than 3-times as long as wide at its base and presents therefore a more slender shape; notch between the two hooks rather sharp, acute. These legs are slightly setose.

Ova not numerous, rather large, 0,95 mm. long. Length 15 mm.

Remarks. *Syn. hululensis* Cout. and *Syn. tumidomanus* (Paulson) differ from this species by the carpocerite and the antennular peduncle being of a more slender form: the carpocerite is namely 4-times longer than wide, whereas the median antennular article is one and a half as long as wide at the apex. PAULSON's species differs moreover by the clearly spinous, postero-lateral angles of the telson.

Syn. Paulsoni Nob., together with the subspecies described by COUTIÈRE, may be distinguished by the terminal spine of the scaphocerite projecting beyond the carpocerite; *Syn. Paulsoni Rameswarensis* and the typical *Syn. Paulsoni* differ, moreover, by the lateral spine of the basicerite being shorter than the outer margin of the basal portion; *Syn. Paulsoni liminaris* by the upper angle of the basicerite bearing no spine, whereas, like in *Syn. Paulsoni Senegambiensis*, the carpocerite has a more slender form. The carpocerite of *Syn. Paulsoni Kurracheensis*, finally, is 2,75-times as long as wide.

IV. *Biunguiculatus* group.

† 30. *Synalpheus biunguiculatus* (Stimpson) Cout.

Synalpheus biunguiculatus (Stimpson) H. Coutière, in: Alpheidae Mald. and Laccad. Archip. 1905, p. 873, Pl. LXXI, Fig. 8.

Nec: *Alpheus biunguiculatus* J. G. de Man, in: Archiv f. Naturg. 53. Jahrg. 1887, p. 502, Fig. 6 and 6*a*.

Stat. 64. May 4/5. Kambaragi-bay, Tanah-Djampeah. Depth up to 32 m. Coral, coralsand. 1 ova-bearing female.

Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 male and 1 ova-bearing female.

Stat. 299. January 27/29. 10° 52′.4 S., 123° 1′.1 E. Buka- or Cyrus-bay, South coast of Rotti-island. Depth up to 36 m. Lithothamnion. 1 ova-bearing female.

It is with some doubt that these specimens are referred to *Syn. biunguiculatus* (Cout.), not only because in COUTIÈRE's description no measurements at all are indicated, but also because in all these specimens the large cheliped is missing.

In the male from Stat. 282, long 13,5 mm., the frontal and the antennal region closely accord with Fig. 8 of COUTIÈRE's paper: the rostrum is 4,4-times as long as wide in the middle, just as long as the triangular, obtusely-pointed, lateral spines and reaches just to the middle of the visible part of first antennular article.

The antennular peduncle is 4,5-times as long as wide at the distal extremity of median article, this article one-third longer than wide distally; the visible part of basal article is one and a half as long as the second, the third one-fourth shorter than the second. Carpocerite five-times as long as wide, surpassing the antennular peduncle by the whole length of third article; the two spines of the basicerite are as long as in Fig. 8, but slightly curved outward at their tips. The scale extends to the apex of median article, the terminal spine almost to that of the third, but the free part of the scale extends farther backward than in Fig. 8, namely almost to the middle of the visible part of basal article.

The specimens from the stations 64 and 299, which are 18 mm. and 15 mm. long, fully accord with the described one, but in the female, long 13 mm., from Stat. 282 the rostrum and the lateral spines agree with Fig. 9 of COUTIÈRE's paper, which represents *Syn. pachymeris*.

For the measurements of the telson I refer to table A, which indicates that the telson presents nearly the same dimensions in the male and in the female from Stat. 282, though

the female differs somewhat from the male and from the two other specimens as regards the frontal teeth and the measurements of the legs. The telson resembles Fig. 8*d* (l. c.), but the posterior margin is a little less prominent and its outer angles are decidedly acute, though measuring only one-fourth of the contiguous, short, outer spinules. The anterior spinules of the upper surface are 0,25 mm. long, those of the posterior pair 0,27 mm.; they are rather large, those of the posterior pair measuring, in the male, about one-eighth of the length of the telson.

Merus of the small cheliped of the male 3,4-times as long as wide, upper margin unarmed at apex. Relative dimensions of small chela: fingers 1; total length 3,32; heigth 1,1, the chela just 3-times as long as high. The fingers measure in Fig. 8*b* (l. c.) just one-third the total length of the chela, but are in the male from Stat. 282 a little shorter; the fingers are tapering, not enlarged and the dactylus is fringed, along its outer margin, with rather long, stiff setae, both in the male and in the female. Merus of second legs in the male 5-times as long as wide. First segment of the carpus 3,6-times longer than thick, a little shorter than the sum of the four following, the proportion being as 1 : 1,125; chela precisely as long as the first segment, fingers one-third longer than the palm. The females from the two other stations agree with the male, but in the female from Stat. 282 the merus is 4,4-times longer than wide; the first carpal segment is 3-times as long as thick and comparatively shorter, the proportion between this segment and the sum of the four following being 1,37; the chela appears a little longer than the first segment.

As results from Table B the relative dimensions of the female from Stat. 282 agree much more with those taken from the figure 8*c* (l. c.) than with those of the male and of the two females from the two other stations, probably, however, these differences may be considered as individual. The propodus bears in the specimens from Stat. 282 eight spinules, in the adult female from Stat. 64 nine, in that from Stat. 299 ten spinules. Measured from the base of the anterior margin to the tip of the ventral hook, the dactylus proves to measure one-sixth of the propodus and to be little more than twice as long as broad near the articulation; the two hooks are subequal in length, the ventral twice as long as broad at its base, the dorsal hook appears a little broader at its base than the ventral when measured from the suture to the anterior margin; the anterior margin of the ventral hook is directed obliquely to the posterior margin of the appendage, the two hooks are parallel and the notch between them is concave at the base, while in Fig. 8*c'* (l. c.) the angle appears acute.

Ova rather numerous, 0,73—0,8 mm. long.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.
Proportion between the length of telson and width of posterior margin. . .	3,23	3,32	3,28	3,1
Proportion between the width at the base and that of the posterior margin.	2,2	2,4	2,6	2,24
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,45	1,43	1,5	1,4
Proportion between the distances of both pairs from the posterior margin. .	1,57	1,72	1,7	1,58

Table B.

Relative dimensions of		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.
Merus	of the third legs	2,6	2,5	2,5	2,58	2,35
Carpus		1	1	1	1	1
Propodus		1,7	1,7	1,36	1,8	1,56
Proportion between the merus and the propodus		1,57	1,45	1,83	1,45	1,5
Proportion between length and width of merus		3,56	3,7	3	3,48	3,18
Proportion between length and width of propodus		5	5	4	5	4

N° 1 female from Stat. 64; N° 2 male, N° 3 female from Stat. 282; N° 4 female from Stat. 299; N° 5 measurements of the species occurring in the Maldive Archipelago, taken from Fig. 8*c* of COUTIÈRE's paper.

General distribution: Suez (COUTIÈRE); Djibouti (COUTIÈRE); Maldive and Laccadive Archipelago (COUTIÈRE).

† 31. *Synalpheus amabilis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1910, 295.

Stat. 240. November 22 till December 1. Banda. From 9—36 m. Lithothamnion. 1 young specimen, without eggs.

A new species of the *Biunguiculatus* group, closely related to *Syn. biunguiculatus exilipes* Cout. (H. COUTIÈRE, Fauna Mald. and Laccad. Archip. 1905, p. 874, Pl. LXXI, Fig. 10).

Rostrum acute, a little more than one and a half as long as wide at its base, slightly reaching beyond the middle of the visible part of basal antennular article; lateral spines also acute, one-fifth shorter than the rostrum, projecting straightly forward and separated from the rostrum by broad intervals, the outer margins of which are sinuate at the base.

Antennular peduncle 4,3-times as long as wide at the distal end of median article; visible part of the basal article one and a half as long as the second, the latter a little longer than wide at the distal end (proportion 5 : 4), the third article one-fifth shorter than the second; the three articles are in the proportion to one another as 8 : 5 : 4. Stylocerite acuminate, as long as basal article.

Lower spine of the basicerite rather stout, a little shorter than the stylocerite and than the outer border of the basal portion; upper angle unarmed, obtuse. Carpocerite 4,5-times as long as wide in the middle, measured on the lower face, and surpassing the antennular peduncle by the total length of third article. Outer margin of the scaphocerite slightly concave, the terminal spine as long as the antennular peduncle and exceeding by one-fourth of its length the rounded tip of the well developed scale that reaches to the 2nd third part of the distal antennular article.

Telson quite characteristic, much narrowing backward. Its length equals just 4-times the width of the posterior margin, the latter one-third of the width at base; posterior margin very prominent, semicircular, outer angles not marked, longer internal spinules reaching far beyond the end of the telson, their length being in proportion to the width of the posterior margin as 18 : 25. The spinules of the upper surface are small, of equal

length, viz. 0,15 mm. long, and inserted near the lateral margins; the anterior pair a little before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,64, whereas the proportion between the distances of both pairs from the end of the telson is indicated by the number 1,74.

In both chelipeds the upper margin of the merus ends in a small acute tooth at the apex, the merus of the large cheliped is 2,6-times as long as wide, that of the other 3,53-times. The large chela shows the following proportions: fingers (dactylus) 1; total length 3,77; height 1,18. The chela is 3,2-times as long as high and the anterior margin of the palm terminates in an acute spiniform tooth, which is directed obliquely upward. The large chela is 2,76-times as long as the smaller, which is 3,5-times as long as high; the proportions of the smaller chela are: fingers 1; total length 2,73; height 0,8. Palm unarmed distally, fingers tapering; the dactylus is glabrous above, the fingers presenting only the usual setae along their margins.

Merus of second legs 5,3-times as long as wide, just as long as the telson. The first segment of the carpus, that is 4-times as long as thick, appears a little shorter than the sum of the four following, the proportion being as 1 : 1,1; the chela, the fingers of which are in proportion to the palm as 7 : 5, appears as long as the four last carpal segments taken together.

Following legs slender, resembling those of *Syn. biunguiculatus exilipes* Cout. Relative dimensions of the third legs: merus 2,5; carpus 1; propodus 2,2. Merus unarmed, slender, 4,8-times as long as wide and 1,14-times longer than the propodus; the merus is just as long as that of the small cheliped. Propodus also slender, 8-times as long as wide, with 10 rather short spinules on the posterior margin that are 0,066—0,088 mm. long. When measured from the base of the anterior margin to the tip of the ventral hook, the dactylus which is 2,6-times as long as wide near the articulation, proves to measure almost one-seventh of the propodus. The dactylus resembles that of the variety *exilipes* Cout. (H. Coutière, l. c. Fig. 10*a''*); the ventral hook, which is one and a half as long as thick at its base, continues the lower margin in a concave curve, but the dorsal hook which is about twice as long as thick at its base and here slightly thicker than the other, appears just one and a half as long as the latter; notch between the two hooks rounded at the base. Length of the single specimen 10,5 mm.

† 32. *Synalpheus bituberculatus* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 294.

Stat. 60. April 27/28. Haingsisi, Samau Island, Timor. Lithothamnion in 3 m. and less. 1 ova-bearing female.
Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Coralreef. 1 young specimen.
Stat. 164. August 20. 1°42'.5 S., 130°47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 4 adult specimens, the largest one ova-bearing.
Stat. 184. September 11/12. Anchorage off Kampong Kelang, South coast of Manipa-island. 36 m. Coral and sand. 1 very young specimen.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 6 specimens of medium size or still younger, the largest specimen with eggs.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 specimen of medium size.

Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 ova-bearing female of medium size, lodging a Bopyrid in the carapace, and 3 young specimens.

A new species of the *Biunguiculatus* group, closely related to *Syn. pachymeris* Cout. from the Western Indian Ocean, but at first sight distinguished from this and perhaps from all other species of this genus, excepting *Syn. Pescadorensis* Cout. and *Syn. septemspinosus* de Man, by the anterior margin of the palm of the large chela terminating in two conical tubercles placed abreast. Thanks to the kindness of Professor COUTIÈRE a specimen of *Syn. pachymeris*, from Saya de Malha (Percy Sladen Trust Expedition) and determined by him, is lying before me. The four specimens from Stat. 164, the largest of which, an egg-bearing female, is 21,5 mm. long, have lost the large cheliped, therefore one of the specimens from Stat. 273, a male long 12,5 mm., will be described as the type.

The rostrum is slender, five times as long as wide in the middle, the acute tip is curved upward and reaches to the middle of the visible part of first antennular article; the rostrum is carinate above and the rostral carina extends to the posterior end of the eyes. Lateral spines triangular, acute, one-third shorter than the rostrum, reaching to the 2nd third of the visible part of basal article, slightly setose at the tips that are not curved upward, with the outer margin slightly concave and separated from the rostrum by wide intervals, obtuse at the base. Second article of antennular peduncle one and a half as long as wide distally, measuring two-thirds the visible part of basal article and one-third longer than the third article, the proportions of the three articles being as 6 : 4 : 3. Stylocerite slender, acuminate, reaching to the second 3rd or 4th part of median article. Basicerite with the upper spine well developed, the acute tip directed upward and outward; lateral or inferior spine slender, longer than the stylocerite, reaching to the middle or just beyond the middle of median article, with the acuminate tip slightly turned outward. The carpocerite is slender, 5,5-times longer than wide, exceeding the antennular peduncle by the whole length of the third article; terminal spine of scaphocerite a little shorter than the carpocerite, but still much surpassing the antennular peduncle, its outer margin slightly concave, but not curved inward at the tip; it exceeds by half its length the very narrow scale that reaches to the apex of median antennular article.

The telson, the measurements of which are found in Table A, resembles that of *Syn. pachymeris*. The length equals 3—3,24-times the width of the posterior margin and in both species the anterior pair of spinules are situated far before the middle; the posterior margin, however, is less prominent than in *Syn. pachymeris* and in the latter the spinules of the upper surface are inserted nearer to the lateral margins. Outer angles of the posterior margin acute, though very short. In the young male from Stat. 282 the telson appears a little shorter with regard to the width of the posterior margin.

Posterior angle of first abdominal pleura produced, in the male, into a small tooth, the following also acute while in the third and the fourth the anterior angle is also sharp.

Merus of large cheliped of the male twice as long as wide, with a small, acute tooth

at the apex of the upper margin; there is also an acute tooth at the apex of the infero-external margin. The measurements of the large chela, taken along the infero-external side, are: fingers 1; total length 3,3; height 1,2, this chela being 2,75-times longer than high. Characteristic of this species are two conical, though rather obtuse tubercles, placed abreast at the anterior margin of the palm and directed obliquely forward and upward; they are nearly of the same size, the outer usually a little smaller than the other. The large chela of an ova-bearing female from the same station and about of the same size as the male, shows the following proportions: fingers 1; total length 3,75; height 1,5, the chela being just 2,5-times longer than high. In an egg-bearing female from Stat. 315 these numbers are: fingers 1; total length 4; height 1,6. The two tubercles on the anterior margin of the palm are just as well developed as in the male.

In the male from Stat. 273 the large chela is 2,7-times longer than the other and the relative dimensions of the small chela are: fingers 1; total length 3; height 1. Merus of small cheliped 3,6-times longer than wide. In the small chela of the adult female, long 21,5 mm., from Stat. 164 the fingers are a little longer, the proportions being: fingers 1; total length 2,9; height 1. The merus is unarmed at the apex of the upper margin and the palm bears no tubercles near the articulation of the dactylus.

Merus of second legs 4,45-5-times longer than wide. First carpal segment rather stout, shorter than the sum of the following and from the measurements in Table B it seems to result that the difference diminishes the larger the specimens are. The second, the third and the fourth segment are of equal size. Chela slightly longer than the first segment, but shorter than the sum of the following, fingers in proportion to the palm as 4 : 3.

The relative dimensions of the third legs and the proportion between the length of the merus and that of the propodus are indicated in the Table C. Merus 3,3—3,6-times longer than wide; in the typical male from Stat. 273 it bears five spinules on the distal half of the posterior margin, which are 0,12—0,17 mm. long, and the propodus is armed with eight spinules, long 0,15 mm.; in the adult female, long 21,5 mm., from Stat. 164 the merus is armed with seven spinules, long 0,15—0,22 mm., in the very young specimen from Stat. 184, however, there are only two spinules, long 0,036 and 0,055 mm., on the merus and seven spinules on the propodus. Dactylus one-sixth of the propodus, when measured from the proximal extremity of the anterior margin to the tip of the ventral hook and 2,2-times longer than wide; in the adult female from Stat. 164 the dactylus measures hardly one-seventh the length of the propodus and appears twice as long as wide. Dactylus similar to that of *Syn. pachymeris*, dorsal hook twice as long and one and a half as wide at its base as the ventral (the width taken from the suture near the base of the ventral hook to the outer margins); in young specimens, as e. g. in that from Stat. 78 the dorsal hook appears one and a half as long and but a little broader than the ventral hook; interval between both hooks wide, rounded at the base.

In the specimen from Stat. 78 the rostrum appears just as long as the acute, lateral teeth which are directed inward; in the adult specimens from Stat. 164 the three frontal spines are shorter than in the described male, the rostrum reaching about to the 2nd third part of the visible basal joint, and the lateral spines are still shorter.

The eggs are rather numerous, those of the female, long 21,5 mm., are 1,17 mm. long, those of a female, long 14,5 mm., from the Jedan Islands, 1,02 mm. and those of a female from Stat. 315 are 1,09 mm. long.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Proportion between the length of the telson and the width of the posterior margin	3	3	3,2	3,24	2,6	3
Proportion between the greatest width and that of the posterior margin	2,33	2,2	2,2	2,36	2,1	2,2
Proportion between the length of the telson and the distance of the anterior pair from the posterior margin	1,64	1,35	1,51	1,45	1,43	1,4
Proportion between the distances of both pairs from the posterior margin	1,72	1,62	1,7	1,8	1,7	1,6

Table B.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Proportion between the length and the width of the merus	of second legs	4,58	4,45	5	4,5	4,6	4,2
Proportion between the length of the first carpal segment and the sum of the following	of second legs	1,5	1,1	1,6	1,33	1,25	1,2
Proportion between the length and the width of first segment	of second legs	2,73	3,1	2,5	3	3,16	3,1

Table C.

		N° 1.	N° 2.	N° 3.	N° 4.	N° 5.	N° 6.
Relative dimensions of Merus	of third legs	2,7	3	3	3	2,8	2,7
Relative dimensions of Carpus	of third legs	1	1	1	1	1	1
Relative dimensions of Propodus	of third legs	1,9	1,83	2,2	1,9	1,9	1,5
Proportion between the length of the merus and that of the propodus	of third legs	1,42	1,6	1,4	1,58	1,5	1,8
Proportion between the length and the width of the merus	of third legs	3,3	3,3	3,6	3,4	3,26	3,2
Proportion between the length and the width of the propodus	of third legs	4,75	4,55	5,4	4,8	4,65	3,75

N° 1 specimen long 11,5 mm. from Stat. 78; N° 2 ova-bearing female, long 21,5 mm., from Stat. 164; N° 3 young specimen, long 7,5 mm., from Stat. 184; N° 4 male, long 12,5 mm., from Stat. 273; N° 5 specimen from Stat. 282; N° 6 cotype of *Syn. pachymeris* Cout. from Saya de Malha, long 10,5 mm.

Remarks. *Synalpheus pachymeris* Cout. at once differs by the anterior margin of the palm of the large chela terminating only in one tubercle, which is directed straightly forward and not obliquely upward. It differs also by the terminal spine of the scaphocerite being not longer, but distinctly shorter than the antennular peduncle. The relative dimensions of both chelae are the same in the two species, but the merus appears a little stouter, that of the large cheliped being 1,66-times, that of the smaller 2,6-times longer than wide and the merus of the larger carries an acute tooth at the apex of the upper margin. The measurements

of the second and third legs and of the telson of the specimen from Saya de Malha are indicated in the Tables sub N° 6; they much agree with those of *Syn. bituberculatus*, but the propodus of the third legs is shorter with regard to the other joints and appears therefore of a stouter shape because the absolute width is the same.

† 33. *Synalpheus bispinosus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1910, p. 302.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 15—22 m. Mud, coral and coralsand. 1 male and 1 ova-bearing female.

Stat. 240. November 22 till December 1. Banda-anchorage. From 9—36 m. Lithothamnion-bank in 18—36 m. 1 very young specimen.

A new species of the *Biunguiculatus* group, closely related to *Syn. biunguiculatus* (Stimpson) Cout., variety *exilipes* Cout., but distinguished from all other species of this genus by the posterior margin of 6th abdominal somite being bispinose.

Frontal spines in the male from Stat. 33 as in the quoted species (H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXI, Fig. 10), but the rostrum less slender, 4-times as long as wide in the middle and shorter with regard to the length of the visible part of first antennular article, not yet quite reaching to the middle of that part. Lateral teeth and the notches separating them from the rostrum as in the variety *exilipes* Cout., the lateral teeth barely shorter than the rostrum and with the tips rather obtuse; the outer margins of the lateral teeth are very slightly concave and clearly directed inward.

Antennular peduncle 4,4-times as long as wide at the distal extremity of median article; the visible part of first article, the second and the third are in proportion to one another as 7 : 4 : 3, just as in *Syn. biunguiculatus* (Stimpson) Cout. (H. COUTIÈRE, l. c. Fig. 8); stylocerite reaching to the 2nd fourth part of median article.

Carpocerite 5-times as long as wide in the middle, projecting beyond the antennular peduncle by the whole length of third article. Terminal spine of scaphocerite hardly longer than the antennular peduncle, shorter than the carpocerite and extending by one-third of its length beyond the narrow scale that reaches to the 2nd third part of distal antennular article. Lateral spine of basicerite slender, nearly as long as the stylocerite, spine at the upper angle well developed, measuring one-third the length of the lateral.

In the female from the same station which is of a somewhat smaller size, the rostrum appears a little more slender than in the male, 5-times as long as wide in the middle and it reaches to the distal third of the visible part of first antennular article; the rostrum is also slightly longer than the lateral teeth. The antennular peduncle is 4-times as long as wide at the distal end of median article, the visible part of the first is but one and a half as long as the second and the second hardly longer than the third; the stylocerite extends to the 2nd third part of median article and the scale of the scaphocerite almost to the middle of the third. Carpocerite 5-times as long as wide, terminal spine of scaphocerite and spines of the basicerite also like in the male.

In the very young specimen, long 7 mm. from Banda, the rostrum resembles that of

the female, but it reaches to the distal fourth of the visible part of first article, the lateral teeth are of a somewhat stouter shape and only extend to the middle of first article. The antennular peduncle has a much stouter form, being only 3-times as long as thick, the second and the third article are equal and but a little shorter than the visible part of the first. Carpocerite 4,3-times as long as wide, scale reaching to the middle of third antennular article and somewhat wider than in the adult individuals.

In the male the posterior angle of the first abdominal pleura is produced into a subacute tooth, the posterior margin of which bears two small denticles, the anterior angle is also acute; the third and the fourth pleura terminate also in an acute tooth, the anterior angle of the third is acute, that of the fourth rather obtuse; the second bears a subacute tooth posteriorly, whereas the fifth and the sixth are also acute, especially the fifth. Sixth somite one and a half as wide as long, outer angles of the posterior margin produced into an acute tooth, which is directed slightly outward.

Telson, in the adult male, 3,44-times as long as the posterior margin is wide, this margin moderately prominent, the outer angles acute, but not projecting at all; the longer inner spinules extend by half their length beyond the posterior margin. Proportion between the width at base and that of the posterior margin 2,3. Spinules of the upper surface large, those of the anterior pair 0,365 mm. long, those of the posterior 0,38 mm., one-seventh the length of the telson and situated close to the lateral margins; the anterior pair is situated far before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,46, the proportion between the distances of both pairs from the posterior margin 1,6.

In the female the pleura of the first somite are rounded anteriorly, the second are also rounded, the third and the fourth terminate in an acute tooth; the two following are subacute, sixth somite and telson as in the male.

Merus of large cheliped of the male 2,1-times as long as wide, upper margin terminating in a small, acute tooth at apex, the two other margins with the apices also acute. Relative dimensions of the large chela: fingers 1; total length 3,7; height 1,33, this chela being 2,75-times as long as high. Anterior margin of the palm terminating in an obtuse tubercle, that is rounded above.

Merus of small cheliped 3,2-times as long as wide, the margins unarmed at the apex. Proportion between the length of both chelae 2,4. Relative dimensions of the small chela: fingers 1; total length 3,1; height 0,92, this chela 3,36-times longer than high. Dactylus tapering, its outer margin fringed with long stiff setae from the articulation to the tip.

Merus of second legs 4,6-times as long as wide. Carpus of a stout shape, first segment 2,75-times as long as thick at distal extremity, a little shorter than the sum of the four following, the proportion being as 4 : 5; the second, the third and the fourth are equal, a little wider than long. The length of the chela, the fingers of which are one-fourth longer than the palm, appears intermediate between the length of the first carpal segment and that of the four following taken together.

Relative dimensions of the third legs nearly as in *Syn. biunguiculatus* (Stimpson) Cout.,

but the merus is a little more slender (Confer the Table). The propodus of the adult male bears ten spinules that are 0,16—0,17 mm. long, that of the young specimen from Banda six, long 0,044—0,075 mm. Measured from the base of the anterior margin to the tip of the ventral hook, the dactylus measures in the adult male a little more than one-seventh, in the young specimen one-fifth of the length of the propodus. The dactylus is half as broad at its base as it is long; the ventral hook is twice as long as wide at its base and its anterior margin is almost perpendicular to the posterior margin of the dactylus; dorsal hook one and a half as long as the other and one and a half as wide at its base, measured from the suture to the anterior margin. The two hooks hardly diverge and the notch between them is concave at the base.

Table A.

	N° 1.	N° 2.
Proportion between length of telson and width of posterior margin	3,44	3,6
Proportion between the width at the base and that of posterior margin	2,3	2,2
Proportion between the length of telson and the distance of the anterior pair from the posterior margin	1,46	1,44
Proportion between the distances of both pairs from the posterior margin	1,6	1,7

Table B.

		N° 1.	N° 2.
Relative dimensions of	Merus	2,5	2,3
	Carpus	1	1
	Propodus	1,75	2
Proportion between the length of the merus and that of the propodus.	of third legs	1,43	1,17
Proportion between the length and the width of the merus		4	4,24
Proportion between the length and the width of the propodus		5	6

N° 1 adult male from Stat. 33; N° 2 young specimen from Banda.

The adult male from Stat. 33 is 15 mm. long, the ova-bearing female 14 mm.; ova few in number, 0,75 mm. long.

† 34. *Synalpheus triacanthus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 301.

Stat. 289. January 20. 9° 0'.3 S., 126° 24'.5 E. Timor Sea. 112 m. Mud, sand and shells. 1 male, found in a specimen of *Solenocaulon* Gray.

A new species of the *Biunguiculatus* group, distinguished, like *Syn. trispinosus* de Man, by the posterior margin of the 6th abdominal somite being armed with three spines.

Rostrum long, slender, acuminate, with the tip curved upward and reaching to the 2nd third part of median antennular article; the free part of the rostrum, which is obtuse above, is a little more than 4-times as long as wide at its base. Lateral spines slender and pointed, slightly directed outward and upward, measuring a little more than one-third the length of the free part of the rostrum, and extending almost to the middle of the visible part of first antennular article. Notches between the lateral spines and the rostrum rather wide, the notches as wide anteriorly as they are long. Antennular peduncle 4,1-times as long as wide at the apex

of median article; visible part of basal article one and a half as long as the second and about twice as long as the third. Stylocerite characteristic, its basal part, as long as the lateral frontal spines, dilated, the anterior part very slender, spiniform, acuminate, longer than the rostrum, just reaching beyond the middle of the median article, that appears a little viz. one-fourth longer than wide distally. Carpocerite, like in *Syn. trispinosus*, as long as the antennular peduncle, but of a less slender shape, being 4,5—5-times as long as wide in the middle. Lateral spine of basicerite a little shorter than basal antennular article, but much longer than the lateral frontal spines; spine at the upper angle rather large, almost half as long as the lateral. Terminal spine of the scaphocerite as long or hardly longer than the carpocerite, projecting but for a short distance beyond the well-developed, rather broad scale, that almost reaches to the tip of the antennular peduncle.

The pleura of the 2nd—4th somites of the abdomen terminate in an acute tooth, the tooth at the posterior angle of the pleura of the first somite subacute, pleura of the 5th somite also subacute; 6th somite almost twice as wide as long, the median tooth excluded, the posterior margin with a spiniform tooth at the outer angles that is directed outward and with a smaller one in the middle. Unfortunately the posterior margin of the telson is mutilated, so that its width could not be measured exactly; the length of the telson seems to equal, however, about 2,4-times the width of the posterior margin and the proportion between the latter and the width at base seems to be about 1,57. Spinules of the upper surface 0,3 mm. long, one-ninth the length of the telson, and implanted near the lateral margins; the anterior pair is placed a little before the middle, the proportion between the length of the telson and the distance of that pair from the posterior margin being 1,7, the proportion between the distances of either pair from that margin 1,66. The outer angles of the posterior margin are spiniform, but probably do not reach beyond the median part.

Merus of large cheliped twice as long as wide, the strongly curved, upper margin with the apex unarmed, but presenting here, like in *Syn. paraneomeris* Cout., a well-marked constriction, which in *Syn. trispinosus*, at least in the female, is wanting; the infero-external and the infero-internal margin are armed, exactly as in *Syn. trispinosus*, with an acute tooth. The relative dimensions of the large chela are: fingers 1; total length 4; height 1,33, this chela being just 3-times as long as high. Anterior margin of the palm with a subacute tooth, directed obliquely upward.

Merus of small cheliped 3-times as long as wide, with the three margins unarmed at apex. Proportion between the length of the two chelae 2,73. The relative dimensions of the small chela are: fingers 1; total length 2,45; height 0,77. This chela which is 3,1-times as long as high, appears much less high with regard to its length than the small chela of *Syn. trispinosus*, both of the male and of the female of this species. Fingers a little more slender than in *Syn. trispinosus*, in other respects agreeing with them.

Merus of second legs 6,4-times as long as wide. First segment of the carpus 5,2-times as long as thick at the distal extremity, one-tenth longer than the sum of the four following; the second, the third and the fourth segment are equal, just as long as thick. Chela scarcely shorter than the sum of the four last segments of the carpus, fingers but a little longer than the palm.

Relative proportions of third legs: merus 2,4; carpus 1; propodus 2, the merus 1,21-times as long as the propodus. Though these proportions are nearly the same as in *Syn. trispinosus*, these joints show a more slender shape and the merus is quite unarmed. The merus, indeed is 4,5-times as long as wide, the propodus 6,6-times and the latter bears ten spinules 0,15—0,17 mm. long. Measured to the tip of the ventral hook, the length of the dactylus proves to be one-eighth that of the propodus and twice the width near the articulation. The rather small, ventral hook appears about twice as long as broad at its base and its anterior margin is directed obliquely with regard to the posterior margin of the dactylus; the much longer and stronger, dorsal hook is twice as long and twice as broad at its base, measured from the suture to the anterior margin of the dactylus, than the ventral hook; the two hooks very slightly diverge and the notch between both is concave internally. Merus of 4th pair also unarmed.

The appendages of the five pleopods are yellowish green coloured.

Length 16 mm.

† 35. *Synalpheus quadridens* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 299.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 ova-bearing female.

Like in *Syn. quadrispinosus* de Man, the posterior margin of the 6th abdominal somite is armed with four teeth, but *Syn. quadridens*, which also belongs to the *Biunguiculatus* group, differs by the stouter shape of the legs and some other differences. Unfortunately the large cheliped and the second legs are missing.

Frontal and antennal region much resembling those of *Syn. pachymeris* (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXI, Fig. 9). Rostrum slender, about 4-times longer than wide in the middle, with the tip rather obtuse and almost reaching to the middle of the visible part of first antennular article; lateral frontal teeth a little longer than the rostrum, reaching just to the middle of the visible part of first antennular article, much wider than the rostrum and much wider at their base than they are long; notches between the rostrum and the lateral teeth, that are also rather obtuse at the tips, narrow, the distance between the tip of the rostrum and that of a lateral tooth being shorter than the latter are long. The outer margin of the lateral teeth is regularly curved, convex.

Antennular peduncle stouter than that of *Syn. quadrispinosus*, 4-times longer than wide at the apex of median article; the proportion between the length of the three articles just as in *Syn. quadrispinosus*. Stylocerite shorter than in this species, reaching to the 2nd third part of median antennular article.

Carpocerite 5-times longer than wide in the middle, extending beyond the antennular peduncle by half the length of the 3rd article or a little more; terminal spine of the scaphocerite as long as the antennular peduncle, the tip slightly directed outward and projecting by one-third its length beyond the narrow scale that reaches to the apex of median antennular article.

Lateral spine of the basicerite as long or slightly longer than the stylocerite, upper spine as in *Syn. quadrispinosus.*

Posterior margin of 6th abdominal somite armed with four triangular, subacute teeth, one at each outer angle and one at either side of the middle, the external teeth twice as long as the submedian teeth. Telson 2,8-times as long and twice as wide at the base as the posterior margin is broad, the latter being a little wider, comparatively, than in *Syn. quadrispinosus*; posterior margin as in this species. As regards the arrangement of the spinules of the upper surface that are 0,175 mm. long, one-eighth or one-ninth of the length of the telson, this species accords with *Syn. quadrispinosus*: the proportion between the length of the telson and the distance of the anterior pair from the posterior margin is 1,35, the proportion between the distances of either pair from the posterior margin 1,4.

Merus of small cheliped 2,65-times longer than wide, upper margin unarmed at apex. Relative dimensions of the small chela: fingers 1; total length 3; height 1,2; this chela is just 2,5-times longer than high and has therefore a much stouter form than that of *Syn. quadrispinosus.* Fingers as in this species. Merus of second legs 4-times as long as wide, the following joints are missing.

Relative dimensions of third legs: merus 2,71; carpus 1; propodŭs 1,77, numbers agreeing with those of *Syn. quadrispinosus.* Merus 1,53-times longer than the propodus. Merus 3,05-times, propodus 4,2-times longer than wide, both members being of a stouter shape than in *Syn. quadrispinosus*; the propodus with eight spinules, long 0,09—0,1 mm. Dactylus measuring a little more than one-sixth the propodus and twice as long as broad near the articulation; its shape is the same as in *Syn. quadrispinosus.*

Ova large, 1,3 mm. long.

Length 12 mm.

† 36. *Synalpheus quadrispinosus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 298.

Stat. 49a. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 young male.
Stat. 164. August. 20. 1° 42′.5 S., 130° 47′.5 E. Between Misool and New-Guinea. 32 m. Sand, small stones and shells. 1 adult specimen without eggs.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands (Pearl-banks). 13 m. Sand and shells. 1 adult ova-bearing female.
Stat. 310. February 12. 8° 30′ S., 119° 7′.5 E. Sapeh Strait. 73 m. Sand with few pieces of dead coral. 1 ova-bearing female.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 young male.

A remarkable new species of the *Biunguiculatus* group, distinguished, like *Syn. quadridens*, by the armature of the 6th abdominal somite.

Frontal and antennal region in the adult female from Stat. 273, which is considered as the type, much resembling those of *Syn. biunguiculatus* (Stimps.) Cout. (vide: H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXI, Fig. 8). Rostrum short, subacute, about 3-times as long as wide in the middle, its upper margin obtuse and appearing, in a lateral

view, slightly concave; the rostrum, which measures $^4/_9$ of the visible part of first antennular article, does not yet reach to the middle of it. Lateral spines as long as the rostrum, rather obtuse at the tips and slightly wider at their base than they are long; notches between the lateral spines and the rostrum rather narrow, the distance between the tip of the rostrum and that of a lateral spine being distinctly shorter than the width of the lateral spines at their base. The three frontal spines bear a few setae at their tips. In the adult specimen from Stat. 164 the rostrum is still shorter, measuring only one-third the visible part of first antennular article.

Antennular peduncle 5-times and its second article one and a half as long as wide at the distal end of the latter; the visible part of basal article is one and a half as long as the second and the second a little longer than the third. In the typical specimen from Stat. 273 the stylocerite reaches just beyond the middle of second article, in the specimen from Stat. 164 almost to the middle.

Carpocerite slender, 5,1—5,3-times as long as wide in the middle, projecting beyond the antennular peduncle by two-thirds or three-fourths the distal article; lateral spine of basicerite a little shorter than the stylocerite, though reaching beyond the first antennular article; spine at the upper angle well-developed, measuring one-fourth the length of the lateral. Terminal spine of scaphocerite reaching almost to the tip of antennular peduncle, projecting but for a short distance beyond the scale which is narrow and which extends to the middle of third article; the terminal spine is separated from the scale until to the distal fourth part of basal article.

The outer angles of the posterior margin of the 6th abdominal somite are produced into an acute, spiniform tooth, which is about as long as the spinules of the upper surface of the telson and directed backward and slightly outward; at either side of the middle the posterior margin carries another triangular tooth, which is directed straightly backward. Between these two submedian teeth which are half as long as the outer ones, the posterior margin is straight; but those parts of the margin that are situated between the outer and the submedian teeth are arcuate, the submedian teeth being separated from them by a triangular notch.

The telson closely resembles that of *Syn. biunguiculatus*, the measurements (Table A) are the same, excepting that in that species the telson appears comparatively somewhat wider at its base; the spinules of the upper surface, 0,35 mm. long, measure also one-eighth the length of the telson. Posterior margin moderately prominent, not semicircular, outer angles acute, but not at all prominent, very small; the median part of the posterior margin is as long as the outer spinules, while the inner spinules reach far beyond it.

Merus of large cheliped in the adult female from the Jedan Islands just twice as long as wide, in the adult specimen from Stat. 164 the proportion is 2,24; upper margin unarmed at apex, in the young male, long 10 mm. from Stat. 315, the upper margin terminates, however, in a triangular, rather acute tooth. Relative dimensions of the large chela: fingers 1; total length 3,77—3,8; height 1,39 or 1,38. This chela appears therefore 2,72—2,75-times as long as high and the anterior margin of the palm terminates in a small rounded tubercle, which is somewhat flattened above; in the young specimen from Stat. 315 this tubercle is rather acute.

Proportion between the length of the large and that of the small chela 2,7, the latter is just as long as the large chela is high. Merus of small cheliped 3,2—3,5-times as long as

wide, unarmed at the apex of the upper margin. The relative dimensions of the small chela are: fingers 1; total length 3—3,2; height 0,86—0,93, and this chela is 3,42—3,46-times longer than high, showing a slightly more slender form than that of *Syn. biunguiculatus*. Fingers as in this species, tapering, glabrous above, outer margin of the dactylus fringed with rather long, stiff setae from the articulation to the tip.

Merus of second legs in the adult female from the Jedan Islands 4,3-times, in that from Stat. 164 4,75-times longer than wide. First segment of the carpus 3,7-, respectively 4-times as long as thick distally, as long as the sum of the four following and scarcely a little longer than the chela, the fingers of which are nearly one and a half as long as the palm; the second, the third and the fourth segment are subequal and the fifth appears one-third longer than thick.

The relative dimensions of the third legs agree also much with those of *Syn. biunguiculatus* (Cout.). As results from Table B, the merus appears, in the adult specimens from the stations 164 and 310, a little longer with regard to the carpus than in the adult female from the Jedan Islands and in the young male from Stat. 315 the propodus appears a little longer and a little more slender: these differences are no doubt individual. The propodus is armed with eight spinules, in the adult female from Stat. 273 0,16—0,17 mm. long, in the young male from Stat. 315 there are only six spinules long 0,09—0,11 mm. Measured from the base of the anterior margin to the tip of the ventral hook, the dactylus proves to measure in the adult female from Stat. 273 one-sixth the length of the propodus and to be nearly twice as long as broad near the articulation; in the specimen from Stat. 164 and in the young male from Stat. 315 the dactylus measures little more than one-seventh of the propodus. The ventral hook, i. e. its anterior margin, is directed perpendicularly to the posterior border of the dactylus, the dorsal hook is a little longer and a little more slender than the other and the notch between both hooks is concave, not sharp at its base. Ova rather numerous, large, those of the female from the Jedan Islands 1,46—1,53 mm. long, those of the female from Stat. 310 are 1,24 mm. long. The female from Stat. 273 is 23 mm. long, that from Stat. 164 20 mm. and that from Stat. 310 16 mm.

Table A.

	N° 1.	N° 2.	N° 3.	N° 4.
Proportion between the length of the telson and the width of the posterior margin	3,2	3,28	3,41	3,31
Proportion between the width at base and that of the posterior margin . . .	2,1	2,1	2,21	2,1
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,4	1,43	1,52	1,56
Proportion between the distances of either pair from the posterior margin . .	1,47	1,55	1,5	1,6

Table B.

		N° 1.	N° 2.	N° 3.	N° 4.
Relative dimensions of	Merus	2,65	2,34	2,74	2,5
	Carpus	1	1	1	1
	Propodus	1,65	1,6	1,8	1,96
Proportion between the length of the merus and that of the propodus		1,6	1,47	1,52	1,27
Proportion between the length and the width of the merus . . .		3,63	3,55	4	4
Proportion between the length and the width of the propodus . .		5	4,7	5	5,8

of third legs

N° 1 Stat. 164; N° 2 Stat. 273; N° 3 Stat. 310; N° 4 Stat. 315.

† 37. *Synalpheus trispinosus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 300.

Stat. 51. April 19. Madura-bay in the southern part of Molo-Strait. 70 m. Fine grey sand. 1 adult ova-bearing female and 1 younger specimen.

An interesting new species of the *Biunguiculatus* group characterized, like *Syn. triacanthus*, by the posterior margin of the 6th abdominal somite being trispinose. Frontal region rather prominent, like in some species of the *Comatularum* group; rostrum slender, commencing with a rather obtuse carina at the anterior fourth of the carapace and reaching to just beyond the first antennular article, with the acuminate tip curved upward. Immediately posterior to the base of the rostrum one observes, in the median line of the carapace, an oval impressed point. Lateral spines also slender and acuminate, reaching to the middle of the visible part of first antennular article, directed straight forward and upward, so that the tips of these spines are lying in a higher plane than the tip of the rostrum.

Antennular peduncle 4,5-times longer than wide or thick at the distal end of median article; the visible part of the first article, the second and the third are in proportion to one another as 16 : 11 : 8, the visible part of the first being almost one and a half as long as the second and twice as long as the third; the second article is almost one and a half as long as wide distally. Stylocerite as long as the rostrum, just reaching beyond the end of basal antennular article; the stylocerite and the three frontal spines are setose at their tips.

Carpocerite 6,5-times longer than wide in the middle, when measured at the lower side, and as long as the antennular peduncle. The lateral spine of the basicerite is slightly turned outward at the tip, clearly shorter than the stylocerite, though almost as long as the basal antennular article; spine at the upper angle well-developed, half as long as the lateral spine. The terminal spine of the scaphocerite is a little longer than the two peduncles and only for a short distance surpasses the tip of the scale, which appears but a little shorter than the antennular peduncle.

Sixth abdominal somite 1,6-times as wide as long in the middle, the median spine excluded; the posterior margin is armed with three acute spines, the two at the outer angles directed a little outward and a little longer than the spine in the middle.

Telson a little more than twice as long as the sixth somite, the median spine excluded, 2,47-times as long as the posterior margin is wide, proportion between the width at base and that of the posterior margin 1,53. Posterior margin as in *Syn. acanthitelsonis* Cout., outer angles produced into large triangular spines that just reach beyond the moderately prominent, median part of the margin, spinules on the posterior margin subequal, nearly as long as the spines at the angles. Spinules of the upper surface implanted near the lateral margins, of moderate length, those of the posterior pair 0,35 mm. long, one-ninth the length of the telson, those of the anterior pair 0,3 mm. long; the anterior pair is implanted in front of the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin is indicated by the number 1,78 and the proportion between the distances of either pair from the posterior margin by the number 1,7, while the distance between the posterior pair and the posterior margin is just one-third the length of the telson.

The merus of the large cheliped of the female is 1,83-times as long as wide, upper margin unarmed at apex, but the infero-external and the infero-internal margin carry an acute tooth at the distal end. Relative dimensions of the large chela: fingers 1; total length 4,3; height 1,53, this chela being 2,8-times as long as high. Anterior margin of the palm terminating in a rather large, conical, though obtuse tooth or tubercle that is directed obliquely upward, upper surface of this tooth setose.

Merus of small cheliped 2,7-times longer than wide, the three margins unarmed at apex. Proportion between the length of both chelae 2,1. Relative dimensions of small chela: fingers 1; total length 2,64; height 0,95, this chela being 2,76-times as long as high. Dactylus slender, tapering, with a few scattered setae above and near the margins.

Second legs rather slender. Merus 6,8-times longer than wide; first carpal segment 6,55-times longer than thick at the distal end, 1,31-times as long as the sum of the four following; the second, the third and the fourth segment are equal, slightly longer than thick.

The proportions of the third pair are: merus 2,38; carpus 1; propodus 1,87, the merus 1,27-times longer than the propodus. Merus rather stout, 3,36-times as long as wide, its posterior margin armed, from the proximal articulation to the distal fourth, with nine short, stout spinules, that are 0,14—0,18 mm. long. Propodus 5,3-times as long as wide, armed with nine spinules, which are 0,15—0,17 mm. long. Taken from the proximal extremity of the anterior margin to the tip of the ventral hook, the dactylus measures almost one-seventh the length of the propodus and it is about half as wide near the articulation as long. Ventral hook twice as long as broad at its base, its anterior margin perpendicular to the posterior border of the dactylus, which border the ventral hook rejoins by a concave curve of short radius; dorsal hook a little longer, both hooks slightly divergent, notch between them concave at base.

Merus of fourth pair with seven spinules, similar to those of the third.

Ova rather numerous, 0,8—0,88 mm. long.

Length of ova-bearing female 19,5 mm.

†38. *Synalpheus septemspinosus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 297.

Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 specimen.

A new species of the *Biunguiculatus* group, related to *Syn. pachymeris* Cout. and to *Syn. bituberculatus* de Man, but distinguished from all other species of this genus by the armature of the sixth abdominal somite.

Rostrum subacute. tolerably slender, 5-times as long as wide in the middle and reaching almost to the middle of the visible part of first antennular article; lateral teeth triangular, subacute, a little more than half as long as the rostrum and one and a half as wide at their base as they are long; the outer margin of the lateral teeth is distinctly concave and the tips of these teeth that are directed straight forward and not upward, are slightly setose. Notches between the rostrum and the lateral teeth wide, just as wide anteriorly as they are long.

Antennular peduncle rather slender, 5,4-times longer than wide at the distal extremity of median article; visible part of basal article one and a half as long as the second and twice as long as the third article, second article one and a half as long as wide distally. Stylocerite reaching to the distal extremity of basal article.

Carpocerite as slender as the antennular peduncle, 5,65-times longer than wide in the middle, projecting beyond the antennular peduncle by the whole length of third article; lateral spine of basicerite slightly turned outward, longer than the stylocerite, almost reaching to the middle of median antennular article, upper spine well-developed, measuring one-fourth of the lateral or inferior. Terminal spine of scaphocerite reaching to midway between the tips of the antennular and antennal peduncles and projecting almost by half its length beyond the narrow scale that reaches to the distal end of median antennular article.

Syn. septemspinosus is characterized by the posterior margin of the sixth abdominal somite being armed with seven acute spines; the largest are the spiniform teeth at the outer angles, another spine, half as long, is observed in the middle of the margin and between this spine and the external ones occur at either side two other teeth, one, as large as the median tooth, midway between it and the external tooth, the other placed either near the median tooth or near the other submedian: of these two teeth namely, which are the smallest of all, the right is placed just near the other submedian tooth, the left just near the median tooth, but this is, of course, an abnormality. Telson 3-times as long and twice as wide anteriorly as the posterior margin is broad; the latter is not much prominent, its outer angles are acute, though very short, and the longer inner spinules, that show exactly the same length as those of the anterior pair of the upper surface, project by half their length beyond the posterior margin. Anterior pair of spinules 0,2 mm. long, implanted far before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,44; posterior pair 0,23 mm. long, just one-ninth the length of the telson, proportion between the distances of either pair from the posterior margin 1,92, the two pairs being rather far remote from one another.

Merus of large cheliped 2,3-times longer than wide, upper margin terminating in an acute tooth. Relative dimensions of the large chela: fingers 1; total length 3,9; height 1,54, this chela being 2,53-times longer than high; like in *Syn. bituberculatus* de Man, the anterior margin of the palm terminates in two tubercles; of these tubercles that are directed straight forward and subacute, the inner is twice as large as the outer.

Merus of small cheliped 3-times longer than wide, upper margin unarmed at apex. Large chela 6,28 mm. long, 2,45-times as long as the other. Relative proportions of the small chela: fingers 1; total length 3,2; height 1, this chela 3,2-times as long as high. The dactylus, that has a rather stout form, though it is tapering and not dilated, carries several tufts of setae near the outer and inner margins and several setae occur also on the outer face of the palm near the base of the immobile finger.

Second and following legs of a stout shape. Merus of second legs 3,6-times longer than wide. First segment of the carpus 2,32-times as long as thick distally, the four following taken together 1,38-times as long as the first; second, third and fourth segment equal; chela

almost as long as the sum of the four last segments, fingers a little longer than the palm. The third legs closely resemble those of *Syn. pachymeris* Cout. (H. COUTIÈRE, Alpheidae Mald. and Lacc. Archip. 1905, Pl. LXXI, Fig. 9*a*). The relative dimensions are: merus 3; carpus 1; propodus 1,84 and the merus is 1,62-times as long as the propodus. Merus 3,4-times longer than wide, armed on the distal half of the posterior margin with e i g h t movable, slender spinules and with several setae; between the third spinule and the carpal articulation the posterior margin is divided into an outer and an inner portion, the fourth to eighth spinules occur on the inner, while the outer portion is setiferous; the five larger spinules are 0,15—0,2 mm. long. Propodus 4,3-times longer than wide, with eight spinules that are of a somewhat stouter form than those of the merus and 0,13—0,15 mm. long. Dactylus small, one-seventh the length of the propodus and twice as long as broad; ventral hook one and a half as long as broad at its base, its anterior margin almost perpendicular to the posterior border of the dactylus, dorsal hook one and a half as long as the other, notch between both hooks concave at the base.

Merus of fourth legs unarmed.

Length 12,5 mm.

† 39. *Synalpheus neptunus* (Dana).

Alpheus neptunus J. D. Dana, U. S. Explor. Exped. Crustacea, p. 553, Pl. 35, Fig. 5*a*.
Synalpheus neptunus H. Coutière, Alpheidæ Mald. and Laccad. Archip. 1905, p. 876 (passim) and in: Proc. U. S. Nat. Museum, Vol. XXXVI, 1909, p. 88 (passim).

Stat. 43. April 4/5. Anchorage off Pulu Sarassa, Postillon-islands. Depth up to 36 m. Coral. 3 young specimens.
Stat. 49ª. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 male of medium size.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Depth up to 36 m. Mud and hard sand. 4 young specimens.
Stat. 162. August 18. Between Loslos and Broken-islands, West coast of Salawatti. 18 m. Coarse and fine sand with clay and shells. 1 young specimen.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 young specimen.
Stat. 301. January 30—February 1. 10° 38′ S., 123° 25′.2 E. Pepela-bay, East coast of Rotti-island. 18—45 m. Mud, coral and Lithothamnion. 1 young specimen.

Professor COUTIÈRE had the occasion to study two type specimens of *Alpheus neptunus* Dana from the Sulu Sea, so that it is possible at present to determine with certainty this species which during half a century has been misunderstood. According to Dana, *S. neptunus* should attain the length of 8—9 lines, the largest of our specimens is the male, long 12 mm., from Stat. 49ª. In this specimen the rostrum and the lateral spines, like also the two peduncles with their spines and appendages accord with the figure 53*a* in COUTIÈRE's quoted paper of 1909, but the scale of the scaphocerite reaches to the distal third part of the median antennular article and the spine of the basicerite, though longer than the basal antennular article, is distinctly shorter than the scale. The stylocerite does not yet reach to the distal extremity of the outer margin of the basal article; when measured in the middle of the upper side, the

median article appears a little shorter than the visible part of the first, but, when measured along the inner margin, the second article appears not shorter than the first.

Telson 2,9-times as long as the width of the posterior margin, proportion between the latter and the width at the base 2,14; the anterior pair of spinules of the upper surface, which spinules are 0,22 mm. long, is just twice as far distant from the posterior margin as from the base. In younger specimens the telson is longer with regard to the width of the posterior margin, so in a very young specimen from Stat. 133, the carapace of which is $3^1/_4$ mm. long, the proportion is 3,2 and in the still younger specimen, examined by COUTIÈRE, the height of the telson equals 3,5-times its posterior margin.

In the specimen from Stat. 49[a] the merus of the large cheliped is just twice as long as wide. The proportions of the chela are: fingers 1; total length 3,58; height 1,45; as is proved by the numbers mentioned by COUTIÈRE, this chela appears in younger specimens longer and higher with regard to the length of the fingers.

In the young individual, examined by the french Carcinologist, the first carpal segment of the second legs was just half as long as the sum of the four following and as the chela, in the young specimen from Stat. 133 in which the carapace is $3^1/_4$ mm. long, the sum of the four last segments is 1,85-times, the chela, the fingers of which are one and a half as long as the palm, 1,6-times longer than the first segment of the carpus; in larger specimens, as in that from Stat. 49[a], the sum of the four last segments is one and a half as long as the first and the chela, the fingers of which are longer with regard to the palm than in very young individuals, only 1,36-times. In a young specimen from Stat 43, in which the carapace is 3,25 mm. long, the four last segments combined measure 2,15-times the length of the first, but the chela only 1,85-times, the chela being a little more than twice as long as the fifth segment. The second segment appears a little smaller than the third and than the fourth. In very young individuals the merus of second legs appears 5-times as long as wide, in the specimen from Stat. 49[a] 4,3-times.

The proportions of the third pair are in the specimen from Stat. 49[a]: merus 2,8; carpus 1; propodus 1,96. The merus is 3,73-times longer than wide and the propodus that carries eight short spinules, long 0,1 mm., 4,7-times; the length of the dactylus, measured from the proximal extremity of the anterior margin to the extremity of the ventral hook, is one-sixth the length of the propodus. The dactylus is 2,2-times longer than wide and the two hooks show the same thickness at their base.

In a specimen long 10 mm. from Stat. 133 the proportions of the third pair are: merus 2,82; carpus 1; propodus 1,82; the merus is 3,64-times, the propodus 4,7-times longer than wide and the dorsal hook of the dactylus appears a little thicker at its base than the ventral. This is also the case in the young specimen from Stat. 43: whereas the posterior margin of the dorsal hook is regularly concave, the anterior margin of the ventral runs like a S. In this specimen the proportions of the third pair are: merus 2,375; carpus 1; propodus 1,75; the merus is 3,4-times, the propodus that bears 7 spinules, 4,37-times longer than wide and the dactylus measures one-fifth the propodus. In the youngest specimen from Stat. 133, finally, the carapace of which is 3,25 mm. long, the proportions of the third pair are: merus 2,66;

carpus 1; propodus 1,9, the merus is 4-times as long as wide, like in COUTIÈRE's young specimen, the propodus 5,7-times and the latter appears also more slender than in older specimens.

General distribution: Sulu Sea (DANA); Feejee Islands (DANA).

†40. *Synalpheus Theano* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 296.

Stat. 164. August 20. 1°42'.5 S., 130°47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 1 specimen without eggs.

A new species of the *Biunguiculatus* group, closely related to *Syn. neptunus* (Dana).

Rostrum short, acute, about 4-times as long as broad or wide in the middle, hardly reaching beyond the middle of the visible part of first antennular article; lateral spines triangular, though rather obtuse and only very slightly shorter than the rostrum; the notches separating the lateral spines from the rostrum are obtuse at their base and the three frontal spines project straightly forward.

Antennular peduncle 5-times as long as thick at the distal end of median article; visible part of the first one and a half as long as the second; third a little shorter than second; median article one-third longer than thick at the distal end. Stylocerite subacute, a little shorter than basal antennular article. Carpocerite slender, 4,5-times as long as wide in the middle, surpassing the antennular peduncle by one-half the length of third article; upper angle of basicerite acute, but devoid of a spine, lateral spine very large, extending to the distal extremity of second antennular article. The terminal spine of the scaphocerite is not curved inward, reaches to the distal third part of third antennular article and projects by three-sevenths of its length beyond the tip of the rather narrow scale that reaches to the fourth distal part of the median antennular article.

The height or length of the telson equals 1,5-times its base and 4-times its posterior margin; the posterior margin is slightly prominent in the middle, the outer angles are not marked and the longer internal spinules, half as long as the posterior margin is wide, extend by half their length beyond the latter. Spinules of the upper surface rather large, those of the anterior pair 0,2 mm. long, those of the posterior 0,22 mm., the latter measuring just one-seventh the length of the telson. These spinules are implanted near the lateral margins, the anterior pair far before the middle, the proportion between the length of the telson and the distance of the anterior pair from the posterior margin being 1,3, the proportion between the distances of either pair from the posterior margin 1,5, the posterior pair being implanted immediately before the middle. Proportion between the greatest width and that of the posterior margin 2,66.

Merus of large cheliped twice as long as wide, upper angle acute. Relative dimensions of the large chela: fingers 1; total length 3,85; height 1,4, the chela 2,7-times as long as high; the anterior margin of the palm terminates, at the inner side, in an acute tubercle, that is directed horizontally forward.

Merus of small cheliped 3,42-times as long as wide, upper margin obtuse at the apex.

Proportion between the length of the two chelae 2,65. Relative dimensions of the small chela: fingers 1; total length 2,7; height 0,9, this chela just 3-times as long as high. The fingers are comparatively shorter than in *Syn. neptunus*; they are slightly enlarged laterally and the dactylus carries some tufts of setae along its outer and inner margins, but the upper face is glabrous.

Merus of second legs 5-times as long as wide. First segment of the carpus stout, 3-times as long as thick distally, shorter than the sum of the four following, the proportion being 1,41; chela just as long as the four last carpal segments taken together, fingers one and a half as long as the palm.

The merus of the third legs is exactly as long as the merus of the small cheliped and 3,64-times as long as wide; the merus is 1,33-times longer than the propodus, which is five times as long as wide and which bears seven spinules, long 0,073—0,088 mm. Measured from the base of the anterior margin to the extremity of the ventral hook, the dactylus proves to measure just one-sixth of the propodus and to be 2,3-times as long as broad near the articulation, the dactylus being of a rather stout form. Ventral hook about twice as long as broad at its base, rejoining the posterior margin by a concave curve, whereas the anterior margin of the hook is directed obliquely to the posterior margin of the dactylus. Dorsal hook hardly longer than the other, of a more slender form, the two hooks nearly parallel, the notch between both hooks broadly concave at the base.

Length 10,5 mm.

Remarks. *Synalpheus neptunus* (Dana) differs by the shorter lateral spine of the basicerite, by the longer fingers of the small chela, by the shorter terminal spine of the scaphocerite and, no doubt, also by other differences.

†41. *Synalpheus Antenor* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 293.

Synon.: *Alpheus biunguiculatus* J. G. de Man, in: Archiv für Naturg. 53. Jahrg. 1888, p. 502, Pl. XXI, Fig. 6, 6*a*.

Stat. 154. August 14. 0° 7'.2 N., 130° 25'.5 E. Off North coast of Waigeu Island. Depth decreased from 83 till 59 m. during the haul. Grey muddy sand, shells and Lithothamnion. 1 very young specimen.

Stat. 164. August 20. 1° 42'.5 S., 130° 47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 1 egg-bearing female.

Stat. 240. November 22 till December 1. Banda-anchorage. Black sand. Coral. Lithothamnion-bank in 18—36 m. 1 very young specimen.

This species was first referred by me in 1888 to *A. biunguiculatus* Stimps., because STIMPSON's description in: Proc. Acad. Nat. Scienc. Philadelphia 1860, p. 31, was fairly well in accordance with it. Ten years later, in 1898, another species, which, however, belongs to the same group, was referred by Prof. COUTIÈRE to the *biunguiculatus* described by me in 1888 and with some doubt also to STIMPSON's species of the same name. STIMPSON's description or rather diagnose is so concise and the characters which he indicates are of such a general nature, that this diagnose appears to be applicable to more than one species of this group: at present

at least, for, in 1888, the number of known species of *Alpheus* (inclusive *Synalpheus*) was much smaller than nowadays. COUTIÈRE's *biunguiculatus*, however, is not identical with the species described by me in 1888. Instead of creating now a new name for the *biunguiculatus* of COUTIÈRE, I prefer to do so for the species which I have described in 1888, especially because the former has given the name to the *Biunguiculatus* group. No less than 47 specimens were, in 1888, lying before me, all collected by the late Dr. BROCK at Amboina and in the Bay of Batavia: it is therefore quite noteworthy that in the "Siboga" collections this species is only represented by three specimens, two of which are very young.

One of the cotypes, described in 1888, a male, long 27 mm., from my private collection, is lying before me; the female from Stat. 164 is a little younger, but *Syn. Antenor* attains the length of 40 mm. and is one of the largest representatives of this genus. The following description is taken from the adult specimen captured at Amboina.

Rostrum acute, 3-times longer than wide in the middle and slightly reaching beyond the 1st third of the visible part of the basal antennular article; lateral spines a little shorter, triangular, subacute and separated from the rostrum by intervals that are narrowing backward and obtuse at their base. The rostrum which is obtusely carinate above, and the lateral spines are setose at their tips.

In the young specimen, long 11,5 mm., from Stat. 154 the rostrum, 4-times as long as wide in the middle, reaches to the middle of the visible part of basal antennular article.

The antennular peduncle is slender, 6-times longer than wide, second article twice as long as wide distally, only about one-sixth shorter than the visible part of basal article; third article half as long as the latter. Stylocerite slender, acuminate, slightly longer than the 1st third part of median article.

In the young specimen from Stat. 154 the antennular peduncle appears a little less slender, about 5-times longer than thick, the second article is one-fifth shorter than the first and the stylocerite reaches to the middle of median article.

Carpocerite very slender, 9-times (in the young specimen almost 8-times) longer than wide and surpassing the antennular peduncle by two-thirds the distal article; upper angle of basicerite subacute, but without a spine, lateral spine reaching to the middle of median article. Terminal spine of the scaphocerite reaching to the transverse suture on the third antennular article, slender and curved outward; the outer margin appears therefore very concave and the terminal spine exceeds by more than two-thirds its length the narrow, rudimentary scale, that reaches to the middle of the second antennular article.

In the young specimen the lateral spine of the basicerite is shorter than the stylocerite and does not yet reach to the middle of median antennular article; the terminal spine of the scaphocerite is as long as the antennular peduncle.

The female from Stat. 164, long 26 mm., does not quite accord with the adult specimen, just described. The stylocerite just exceeds the middle of the second antennular article, while the lateral spine of the basicerite extends to the distal sixth part of that article and the terminal spine of the scaphocerite also slightly surpasses the antennular peduncle.

The telson is quite characteristic, because the spinules of the upper surface are farther

remote from the lateral margins than in most other species; the anterior pair, that is placed in the female from Stat. 164 just in the middle, in the adult male and in the young specimen from Stat. 154 a little before the middle, in the still younger individual from Banda somewhat more, forms with the posterior pair a regular quadrate; as usually are the posterior spinules a little longer than the anterior. The posterior margin of the telson, the upper surface of which is a little hairy and distinctly grooved in the middle except near the base, appears in the adult male but little prominent, not reaching beyond the short, acute, outer angles; in the female from Stat. 164 and still more in the young specimen the posterior margin distinctly projects beyond the outer angles. The longer, inner spinules of the posterior margin are half as long as that margin is wide and are a little longer than the spinules of the upper surface.

The large cheliped of the female was figured by me in 1888. Both in the large and in the small cheliped of the male the upper margin of the merus terminates in an acute triangular tooth at the apex, the merus of the larger is twice as long as wide, that of the smaller 3-times. Large chela massive, much swollen, supero-internal surface of the immobile finger slightly flattened, not so in the female; the anterior margin of the palm ends in a small, conical, though obtuse tubercle, that is directed straightly forward. The relative dimensions are: fingers 1; total length 4,2; height 1,8, the fingers being rather short and the proportion between length and height is 2,38.

Proportion between the length of both chelae 2,7. The relative dimensions of the small chela are: fingers 1; total length 2,6; height 0,86, and this chela is just 3-times longer than high. Both the dactylus and the immobile finger are enlarged laterally, presenting nearly the same width along their whole length; the dactylus that carries no brush of hairs, terminates in an acute tooth at the inner side of which one observes another also acute, at the outer side, however, a truncate lobe; the other finger terminates in four acute teeth, viz. two on the inner side and one at the outer side of the principal hook.

The large chela of the female from Stat. 164 shows the same proportion between length and height, but the fingers are still shorter; they measure one-fourth the length of the palm, the relative dimensions being: fingers 1; total length 5,1; height 2,2.

The measurements of the second and third legs are given in the Tables B and C. The second legs appear in the adult specimens more slender than in the young and the fingers are a little shorter than the palm. Merus of third and fourth legs unarmed, devoid of spinules. In the adult male from Amboina the propodus of the third legs, which much resembles the propodus of *Syn. pachymeris* Cout. and *Syn. bituberculatus* de Man, is armed with 11 spinules, long 0,29—0,34 mm., in the young specimen from Stat. 154 with 8, that are 0,18—0,2 mm. long; the propodus is rather much setose. The dactylus bears, like the small chela of the first pair, a great resemblance to that of *Syn. laticeps* Cout. (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXII, Fig. 11*c*). The dactylus measures somewhat more than one-sixth the length of the propodus, when measured from the proximal extremity of the anterior margin to the tip of the ventral hook and it is 2,3—2,5-times longer than wide. The dorsal hook, which is 3-times longer than wide at its base, is one and a half as long as the ventral, which is only twice as long as wide at its base, but the width at their base is nearly

the same in both hooks, the dorsal hook being but very slightly broader at its base than the other. The notch between both hooks appears, like in *Syn. laticeps*, triangular, obtuse at base.

Eggs large, 1,46 mm. long.

Remarks. *Synalpheus biunguiculatus* (Stimps.) COUTIÈRE 1905 from the Maldive Archipelago differs from *Syn. Antenor* by the less slender antennular peduncle, the second article of which is shorter with regard to the first, by the longer scale of the scaphocerite reaching beyond the second article, while the terminal spine projects less far beyond it. The stylocerite is shorter, the upper angle of the basicerite has a spine. The spinules on the upper surface of the telson show a quite different arrangement, as they are implanted much nearer to the lateral margins and not at the angles of a quadrate. The fingers of the large chela are longer, those of the small chela are not enlarged and the ventral hook of the dactyli appears broader at its base than the other. There are probably still more differences.

Table A.

	N° 1.	N° 2.	N° 3.
Proportion between the length of the telson and the width of the posterior margin .	2,88	3,4	3,65
Proportion between the width at the base and that of the posterior margin	2,1	2,5	2,5
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,9	2	1,9
Proportion between the distances of either pair of spinules from the posterior margin	2	1,54	1,6

Table B.

		N° 1.	N° 3.
Proportion between the length and the width of the merus	of second legs	5,75	5,6
Proportion between the length of the first segment of the carpus and the sum of the following		0,93	1,1
Proportion between the length and the thickness of first carpal segment		5,4	4,3

Table C.

		N° 1.	N° 2.	N° 3.
Relative dimensions of Merus	of third legs	2	2,28	2,17
Relative dimensions of Carpus		1	1	1
Relative dimensions of Propodus		1,4	1,48	1,64
Proportion between the length of the merus and that of the propodus		1,45	1,54	1,32
Proportion between the length and the width of the merus		3,1	3,3	3,6
Proportion between the length and the width of the propodus . . .		4,5	4,45	5,3

N° 1 adult male from Amboina (private collection); N° 2 adult ova-bearing female from Stat. 164; N° 3 young specimen from Stat. 154.

General distribution[1]): Amboina (DE MAN); Bay of Batavia (Pulo Edam and Pulo Noordwachter) (DE MAN).

1) It seems to be impossible to decide which are the species that have been referred to *Syn. biunguiculatus* by BORRADAILE, LENZ and NOBILI. Therefore the localities mentioned by these authors have been omitted.

†42. *Synalpheus Pescadorensis* Cout.

Synalpheus Pescadorensis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 877, Pl. LXXIII, fig. 15.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 1 male and 1 ova-bearing female.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 specimen.

The female from Stat. 96 is almost 11 mm. long, the ova are not numerous, small, 0,58—0,62 mm. long. Rostrum and frontal spines setose at their tips, the rostrum very slightly longer (in COUTIÈRE's specimens shorter) than the frontal spines and measuring a little more than one-third the length of the visible part of basal antennular article; outer margin of frontal spines slightly concave. Median antennular article slightly more than half as long as the visible part of the first, third article as long as the second. Stylocerite acuminate, just as long as the first article.

The carpocerite extends almost by the length of third article beyond the tip of the antennular peduncle, the lower spine of the basicerite reaches almost to the middle of the second article; the terminal spine of the scaphocerite is as long as the antennular peduncle, while the scale reaches to the 2nd third part of the distal article (in COUTIÈRE's specimens only to the middle of the second); upper spine of basicerite as large as in the type.

The telson which is 3,55-times as long as the posterior margin is wide, accords with COUTIÈRE's figure, but the median lobe of the posterior margin is less prominent; the internal spinules, that are 0,29 mm. long, are but a little shorter than the posterior margin is broad and the width of the latter is just one-third the width at the base. The spinules of the anterior pair, long 0,23 mm., are placed far before the middle, the proportion between the length of the telson and the distance of these spinules from the posterior margin being 1,6; the proportion between the distances of both pairs from the posterior margin is 1,92 and the spinules of the posterior pair are 0,28 mm. long, longer than those of the anterior, as in COUTIÈRE's figure 15*d*. The outer angles of the posterior margin of the sixth abdominal somite are acute or spiniform.

Merus of large cheliped of the female 2,36-times longer than wide, upper margin unarmed, infero-internal margin with an acute tooth at the apex. The large chela shows the following relative dimensions: fingers 1; total length 4; height 1,56; the obtuse tubercle at the anterior border of the palm carries a small acute spinule and at the outer side of this tubercle there is still another smaller one that is obtuse.

Merus of second legs 5,4-times longer than wide. The first carpal segment, 3,31-times longer than thick, is a little shorter than the sum of the four following and the chela, the fingers of which are one and a half as long as the palm, appears hardly longer than the first segment. The relative dimensions of the third legs are: merus 2,72; carpus 1; propodus 1,85; the merus is 3,8-times longer than wide, according to COUTIÈRE only a little more than 3-times and the propodus which bears 9 short spinules, long 0,095 mm., 4,72-times. Taken from the proximal extremity of the anterior margin to the tip of the ventral hook, the dactylus measures just one-sixth the propodus; the dactylus, twice as long as wide at its base, accords with the

figure 15*c* of the original description; the dorsal hook, longer than the other and almost as thick at its base, is curved and regularly tapers to the extremity; the ventral hook has a stouter form and, as in *Syn. neptunus*, its anterior margin runs like a S. The proportion between the length of the merus and that of the propodus is 1,47, according to COUTIÈRE 1.6.

With regard to the specimen, long 8 mm., from Stat. 282 the following must be observed. The median antennular article is a little shorter than in the preceding specimen, being a little less than half as long as the visible part of the first and the third is one and a half as long as the second; the stylocerite of the left peduncle extends just beyond the first article, but that of the right is as in the type. The terminal spine of the scaphocerite, though shorter than the carpocerite, much surpasses the antennular peduncle and the scale reaches, like in the preceding female, to the 2nd third part of the third article. Frontal spines as in the preceding female. The relative dimensions of the third pair of legs are: merus 2,52; carpus 1; propodus 1,77; the merus is 4-times, the propodus 5,4-times longer than wide, appearing in this younger specimen a little more slender than in the older one and the proportion between the length of the merus and of the propodus is 1,42. The propodus bears six spinules and the dactylus measures a little more than one-sixth of it.

General distribution: Maldive and Laccadive Archipelagoes (COUTIÈRE); Pescadores (COUTIÈRE).

Alpheus Fabr.

The genus *Alpheus* Fabr. is represented in this collection by no less than 54 species and 8 varieties, of which 20 species and all the varieties proved to be new to science; the varieties all belong to known species. Moreover 3 species and 2 varieties were collected, that are left unnamed, while also a new variety is described, which was not taken by the "Siboga". A rich harvest indeed, a large contribution to the knowledge of this interesting genus, especially when we take in consideration that the old genus *Alpheus* Fabr. has been some time ago discharged of many species that are at present included in the genus *Synalpheus*. The total number of indopacific species of *Alpheus* therefore now amounts to 124, besides 4 that are unnamed, while at present 19 varieties are known, 2 of which are still unbaptized.

The 34 already known species, obtained by the "Siboga", constitute about one-third of the total number of indopacific species, with which we were up to the present acquainted. Of these 34 species 15, i. e. 44%, are widely-ranging forms, distributed throughout the whole Indopacific. These species are the following:

A. collumianus Stimps.
A. ventrosus H. M.-Edw.
A. macrochirus Richt.
A. Alcyone de Man.
A. spongiarum Cout.
A. pachychirus Stimps.
A. frontalis H. M.-Edw.
A. Lutini Cout.
A. insignis Heller.
A. gracilipes Stimps.
A. Miersi Cout.
A. Audouini Cout.
A. strenuus Dana.
A. pacificus Dana.
A. parvi-rostris Dana.

Of these 34 species only 11 have hitherto been moreover observed in the seas west of the Indian Archipelago, in the Indian Ocean, the Persian Gulf, the Red Sea etc. They are the following:

A. paradentipes Cout.
A. paralcyone Cout.
A. paraculeipes Cout.
A. microstylus (Sp. Bate).
A. rapax Fabr.
A. barbatus Cout.
A. macrosceles Alc. & Anders.
A. crassimanus Heller.
A. pareuchirus Cout.
A. Hippothoë de Man.
? *A. euchirus* Dana.

Four other "Siboga" species have moreover only been observed in the Pacific, viz:

A. acuto-femoratus Dana.
A. malleodigitus (Sp. Bate).
A. edamensis de Man.
A. leviusculus Dana.

Of the 4 remaining species *A. bidens* (Oliv.) has, as far as I am aware, not yet been observed outside the Indian Archipelago; *A. chiragricus* H. M.-Edw. is also known with certainty from Hongkong and from the Mergui Archipelago, while *A. Euphrosyne* de Man and *A. microrhynchus* de Man occur also in the Gulf of Siam (Bangkok).

The indopacific species which have not been collected by this expedition, amount to 70 besides one unnamed form belonging to the *Megacheles* group, 9 varieties also have not been obtained. Of these 70 species *A. architectus* de Man occurs at Atjeh, *A. Ehlersi* de Man in the Bay of Batavia and *A. funafutensis* Borr. either also in the Bay of Batavia or off Amboina, while the new variety *angustidigitus* of *A. brevirostris* (Oliv.) was taken at Balikpapan, East coast of Borneo: these four must therefore be included in the Fauna of the Archipelago. The following 8 or 9 ought very probably also to be added to that Fauna, viz.:

A. Seurati Cout.
A. villosus (Oliv.).
A. paragracilis Cout.
A. aglaopheniae Borr.
A. crinitus Dana.
A. cristatus Cout.
A. mitis Dana.
? *A. distinguendus* de Man.
A. macrodactylus Ortm.

Of these species, namely, 2 viz. *A. Seurati* and *A. paragracilis* have been observed both in the Indian and in the Pacific Oceans, *A. aglaopheniae* occurs at the south-eastern extremity of British New Guinea, *A. cristatus* at Thursday Island, *A. villosus*, besides at the island of Reunion, also on the north coast of Australia and on the coast of British New Guinea, *A. crinitus* and *A. mitis* inhabit the Strait of Balabac, while *A. macrodactylus*, observed as well at Sydney as on the coast of Annam, certainly once will prove to occur in the Archipelago. As regards the japanese *A. distinguendus*, it is still doubtful whether this form also occurs in the river near Pare-Pare, Celebes, or not. Of the 70 species and the 9 varieties not obtained by this expedition, 42 resp. 6 have up to the present time only been observed in the seas west of the Archipelago, in the Indian Ocean, the Persian Gulf and the Red Sea. These species are the following:

A. staphylinus Cout.
A. Hailstonei Cout.
A. deuteropus Hilgd.
A. Malhaensis Cout.
A. sp. Cout. 1905.
A. Amirantei Cout.
A. gracilis Heller.
A. gracilis Heller var. *Alluaudi* Cout.
A. splendidus Cout.
A. Shearmei Alc. & Anders.
A. idiocheles Cout.
A. persicus Nob.
A. phrygianus Cout.
A. Danae Cout.
A. baculifer Cout.
A. Providencei Cout.
A. bucephaloides Nob.
A. longecarinatus Hilgd.
A. bucephalus Cout.
A. bradypus Cout.
A. styliceps Cout.
A. clypeatus Cout.
A. superciliaris Cout.
A. Adamastor Cout.
A. Stanleyi Cout.
A. ovaliceps Cout.
A. Percyi Cout.
A. dasycheles Cout.
A. Lanceloti Cout.
A. Coetivensis Cout.
A. paracrinitus Miers.
A. paracrinitus Miers var. *bengalensis* Cout.
A. alpheopsides Cout.
A. paralpheopsides Cout.
A. djeddensis Cout.
A. djiboutensis de Man.
A. rapax Cout. 1905.
A. bis-incisus de Haan var. *Malensis* Cout.
A. hoplocheles Cout.
A. Bouvieri A. M.-Edw.
A. Bastardi Cout.
A. Edwardsi Aud.
A. leptochirus Cout.
A. strenuus Dana var. *angulatus* Cout.
A. bis-incisus de Haan var. *stylirostris* Cout.
A. Bouvieri A. M.-Edw. var. *Hululensis* Cout.
A. Maindroni Cout.
A. malabaricus Fabr.
A. Perezi Cout.

In the Pacific and in the seas of Japan and New Zealand 16 species and 2 varieties occur that are not yet observed elsewhere, they are the following:

A. socialis Heller.
A. tryphopus Nob.
A. brevipes Stimps.
A. obeso-manus Dana.
A. obeso-manus Dana var. *japonicus* Ortm.
A. diadema Dana.
A. novae-zelandiae Miers.
A. pugnax Dana.
A. brevirostris (Oliv.).
A. brevicristatus de Haan.
A. Halesii Kirk.
A. bis-incisus de Haan.
A. japonicus Miers.
A. Haanii Ortm.
A. malabaricus Fabr. var. *dolichodactylus* Ortm.
A. hoplites Nob.
A. euchiroides Nob.
A. lobidens de Haan.

According to Coutière *A. macrochirus* Richt. should occur also on the west coast of Africa (Congo) and in the Gulf of California, while *A. Bouvieri* A. M.-Edw. is also distributed from the Azores to the Gaboon and occurs at Panama.

We have shown in the preceding lines that of the 34 old species obtained by this expedition 44°/₀ range throughout the whole Indopacific Region but that of the 70 that were not obtained, only 2 viz. *A. Seurati* and *A. paragracilis* are as widely distributed. In connection now with the fact that the Indian Archipelago is situated just midway between the western and the eastern parts of the Indopacific Region, we may draw the conclusion that, as a general rule, the range of the remaining 68 species will prove to be rather limited, a conclusion apparently in harmony with what we know about the distribution of several species described long ago. So e. g. *A. socialis*, *A. novae-zelandiae*, *A. brevirostris* and *A. Halesii* are confined to the seas of New Zealand and of South-eastern Australia, while the seas of Japan are inhabited by *A. obeso-manus* var. *japonicus*, *A. brevicristatus*, *A. Haanii*, *A. japonicus*, *A. malabaricus* var. *dolichodactylus* and *A. lobidens*. Three species viz. *A. architectus*, *A. Ehlersi* and *A. funafutensis*, as also the variety *angustidigitus* of *A. brevirostris* (Oliv.), are known to occur in the seas of the Archipelago though not elsewhere and 6 or 7 other ones are probably also confined to these seas. These 19 or 20 species constitute almost one-third of the total number not observed by this expedition, so that we may conclude that the distribution of the numerous species hitherto only observed west of the Archipelago and of the few still only known from Polynesia (*A. tryphopus*, *brevipes*, *obeso-manus*, *diadema*, *pugnax*, *hoplites* and *euchiroides*) will in general prove to be rather limited and more or less confined to the areae in which they have been discovered. Though this conclusion as a general rule may perhaps be regarded as correct, it cannot be denied that in consequence of further research some of these species afterwards will prove to be more widely distributed than is known at present.

The very natural division of this genus into five groups, the third of which is again subdivided into three subgroups, a division proposed by Professor COUTIÈRE in his valuable paper on the Alpheidae of the Maldive and Laccadive Archipelagoes, is also accepted in this work. In the *Megacheles* group, besides 2 known species, 2 new varieties of *A. Hailstonei* were obtained, which are of some interest because in one of them the dactyli are simple like in the type species, but in the other biunguiculate.

The remarkable *Macrochirus* group is represented by 3 known species, by one which is new and by a variety of a Red Sea species (*A. gracilis*): the new form closely approaches to *A. splendidus* Cout. from Djibouti, but it differs by the lateral frontal spines arising from the anterior margin of the front and not from the upper surface of the orbital hoods. It is to this group that has been referred *A. acuto-femoratus* Dana obtained on the reefs off Sawan, Siau-island and on the west coast of Gebé-island, a rare species with which *A. parabrevipes* Cout. proved to be identical.

In the *Obeso-manus* group, the first subdivision of the group *Crinitus*, 2 species were obtained which have been discovered by the "Challenger" and of each of them a new variety was collected; the third is *A. Lutini*, distributed throughout the whole Indopacific and, finally, South of Saleyer a remarkable form was captured which, probably also belonging to this subgroup, differs from all its species by the dactyli being biunguiculate. The group *Crinitus* s. s. is represented by 10 species, 4 of which are new and by a new variety of *A. Stanleyi*. Of these 4 species one is closely related to *A. bucephalus* Cout. and to *A. clypeatus* Cout., the

characters of this species are intermediate between those of these two Alphei. Two other species closely approach to *A. styliceps* which also inhabits the Maldive and Laccadive Archipelagoes and the fourth is a form of small size allied to *A. longecarinatus*. Three species known already long ago and 5 new ones are representing the subgroup *Insignis* Cout., that connects the *Crinitus* and *Brevirostris* groups with one another. The new *A. praedator* is interesting, as it bears, just as *A. bidens*, at each side of the rostral carina, a pointed tooth and *A. bicostatus*, which is related to *A. cristatus* from Torres Straits, is also a remarkable form. *A. Philoctetes* is another new species apparently allied to *A. Lanceloti*, but its true position is doubtful, because the larger cheliped is missing in the single specimen. Two new species, *A. tenuicarpus* and *A. tenuipes*, as also an unnamed form, are characterized by their three posterior legs being very slender.

No less than 10 species of the *Brevirostris* group, 6 of which are new to science, were collected by this expedition. One of the old species is the well-known *A. rapax* Fabr., two adult specimens of which were captured off Nusa-Laut-Island: this species probably ranges throughout the whole Indian Ocean. At a much greater depth than the other species an egg-bearing female was captured, which with some doubt is referred to *A. macrosceles*. Different from the latter, in almost all the new species of this group the rostral carina is more or less prominent and continued to the middle or even beyond the middle of the carapace; the new *A. acuto-carinatus* approaches to *A. macrosceles* by the slender form of the thoracic legs.

The *Edwardsi* group, finally, the largest of all, is represented by 17 species, 4 of which are new, by 4 new varieties and by a species that did not yet receive a specific name. The new *A. proseuchirus* agrees with *A. bis-incisus* by the flattened form of the rostrum, but it differs by the larger chela being hardly emarginate on the lower border and by the very slender shape of the three posterior legs. *A. Coutierei* is chiefly characterized by the prominent rostral carina, continued beyond the posterior third of the carapace. About the very remarkable *A. Polyxo*, the dactyli of which are biunguiculate, I must observe that its place in this group remained doubtful because, unfortunately, in both specimens the larger cheliped is wanting. The new variety *imitatrix* of *A. pareuchirus* is noteworthy because the dactylus of the smaller chela presents the Balaeniceps-form not only in the male but also in the female, *imitating*, as regards this character, the long-known *A. strenuus*.

Several new species are only represented by one, two or three specimens, a fact perhaps fortuitous, perhaps due either to the rarity of these species or to their manner of life: we know indeed through the observations of Coutière, that some species are living in sponges or between the corals of the reefs, in deep holes bored by mollusks or under stones.

As regards the bathymetrical distribution we must in the first place draw the attention to the fact that of more than one-third of the species, exclusive of course of the new forms collected by this expedition, nothing is known about the depth at which they have been obtained. As a general rule the species of this genus are living in shallow water, for more than half the number of all the indopacific species of *Alpheus*, inclusive those obtained by this expedition, have been observed at depths not greater than 30 fathoms or 54 meters; some of these species, namely those that were captured in the Maldive and Laccadive Archipelagoes

and described by COUTIÈRE in 1905, have perhaps been taken, for a part, between 30 and 50 fathoms. Some species have been obtained at a somewhat greater depth not exceeding, however, 150 m., except 2 or 3 that are living in considerably deeper water. These are, in the first place, *A. Shearmei* Alc. & Anders., the unique specimen of which was collected off the Travancore coast at a depth of 430 fathoms. The second, *A. macrosceles* Alc. & Anders., has been observed in the Bay of Bengal in water of 193, 145—250 and 270 fathoms and in the Andaman Sea, at a depth of 188—220 fathoms: the egg-bearing female, which was taken at Stat. 5 and referred with some doubt to this species, was obtained at a depth of 330 m., the bottom being mud. At a depth of 289 m., Stat. 12, another ovigerous female was collected, unfortunately in such a mutilated condition, that it remained doubtful whether it belongs to the variety *leptopus* of *A. malabaricus* Fabr. or not.

The other species taken in water deeper than 30 fathoms are the following:

A. Hailstonei Cout. var. *assimulans* de Man, 90 m., 113 m. and less.
A. Hailstonei Cout. var. *laetabilis* de Man, 34 m., 70 m., 73 m. and from 400—120 m.
A. Amirantei Cout., between 25 and 80 fathoms.
A. Providencei Cout., between 50 and 78 fathoms.
A. paralcyone Cout., 8 m., 45 m., 70 m. and 113 m.
A. spongiarum Cout., 8 m., 13 m., 15 m. and 113 m.
A. Eulimene de Man, 83 m.
A. bidens (Oliv.), 13 m., 83 m.
A. Percyi Cout., between 25 and 50 fathoms.
A. dasycheles Cout., 37 fathoms.
A. gracilipes Stimps., 32 m., 83 m.
A. tenuicarpus de Man, 75 m. and less.
A. sp. de Man, between 54 and 90 m.
A. tenuipes de Man, between 75 and 94 m.
A. lepidus de Man, 75 m. and between 54 m. and 90 m.
A. Sibogae de Man, 70 m., 113 m.
A. acutocarinatus de Man, 72 m. and less.
A. proseuchirus de Man, 72 m., 75 m.
A. pareuchirus Cout., 32 m., 36 m., 57 m. and 90 m.
A. pareuchirus Cout. var. *Leucothea* de Man, 15 m., 70 m. and 54—90 m.
A. pareuchirus Cout. var. *imitatrix* de Man, 18 m., 32 m., 113 m. and 141 m.
A. leptochiroides de Man, 90 m.

The new *A. bicostatus* de Man has been taken, besides on a bottom of coral, coralsand and Lithothamnion, also, in Buton Strait, between floating seaweed. The other species were taken in water, the bottom of which consisted of living or dead coral, coralsand, shells, Halimeda, Lithothamnion, often of black sand or mud or mud with sand.

List of all the Indopacific species of the genus *Alpheus* Fabr., arranged according to their relationship, as indicated in the keys[1]).

I. *Megacheles* group.

staphylinus Cout. 1908.
*Hailstonei Cout. var. **assimulans** de Man 1908.
Hailstonei Cout. 1905.
*Hailstonei Cout. var. **laetabilis** de Man 1908.
Seurati Cout. 1905.
deuteropus Hilgd. 1878.
*collumianus Stimps. 1860.
Malhaensis Cout. 1908.
*paradentipes Cout. 1905.
sp. Cout. 1905.

II. *Macrochirus* group.

villosus (Oliv.) 1789.
paragracilis Cout. 1897.
*acuto-femoratus Dana 1852.
Amirantei Cout. 1908.
gracilis Heller 1861.
*gracilis Heller var. **luciparensis** de Man 1911.
gracilis Heller var. Alluaudi Cout. 1905.
architectus de Man 1897.
socialis Heller 1865.
*ventrosus H. M.-Edw. 1837.
***facetus** de Man 1908.
splendidus Cout. 1897.
Shearmei Alc. & Anders. 1899.
*macrochirus Richt. 1880.
aglaopheniae Borr. 1899.
idiocheles Cout. 1905.

III. *Crinitus* group.

III a. *Obeso-manus* subgroup.

obeso-manus Dana 1852.
*microstylus (Sp. Bate) 1888.
*microstylus (Sp. Bate) var. 1911.
*Lutini Cout. 1905.
obeso-manus Dana var. japonicus Ortm. 1890.
persicus Nob. 1905.
*malleodigitus (Sp. Bate) 1888.
*malleodigitus (Sp. Bate) var. **gracilicarpus** de Man 1909.
phrygianus Cout. 1905.
Danae Cout. 1905.
*sp. de Man 1911.
baculifer Cout. 1908.

III b. *Crinitus* subgroup.

*Alcyone de Man 1902.
Providencei Cout. 1908.
***Arethusa** de Man 1909.
*paralcyone Cout. 1905.
*paraculeipes Cout. 1905.
brevipes Stimps. 1860.
crinitus Dana 1852.
bucephaloides Nob. 1905.
longecarinatus Hilgd. 1878.
***parvus** de Man 1909.
bucephalus Cout. 1905.
***consobrinus** de Man 1908.
bradypus Cout. 1905.
*spongiarum Cout. 1897.
***Eulimene** de Man 1909.
styliceps Cout. 1905.
clypeatus Cout. 1905.
tryphopus Nob. 1906.
superciliaris Cout. 1905.
Adamastor Cout. 1908.
*pachychirus Stimps. 1860.
Stanleyi Cout. 1908.
*Stanleyi Cout. var. **dearmatus** de Man 1910.
ovaliceps Cout. 1905.
*frontalis H. M.-Edw. 1837.

1) The species collected by the "Siboga" are marked with an asterisk and the new species are printed in a more heavy type.

III c. *Insignis* subgroup.

*bidens (Oliv.) 1789.
***praedator** de Man 1908.
cristatus Cout. 1897.
***bicostatus** de Man 1908.
*insignis Heller 1861.
diadema Dana 1852.
Percyi Cout. 1908.
***Philoctetes** de Man 1909.
pugnax Dana 1852.
dasycheles Cout. 1908.
Lanceloti Cout. 1905.
Ehlersi de Man 1909.
*gracilipes Stimps. 1860.
Novae-Zelandiae Miers 1876.
coetivensis Cout. 1908.
mitis Dana 1852.
paracrinitus Miers 1881.
paracrinitus Miers var. bengalensis Cout. 1905.
alpheopsides Cout. 1905.
paralpheopsides Cout. 1905.
***tenuicarpus** de Man 1908.
*sp. de Man 1911.
***tenuipes** de Man 1910.

IV. *Brevirostris* group.

*rapax Fabr. 1798.
brevirostris (Oliv.) 1789.
brevirostris (Oliv.) var. **angustidigitus** n. 1911.
brevicristatus de Haan 1849.
*barbatus Cout. 1897.
djeddensis Cout. 1898.
djiboutensis de Man 1909.
***pubescens** de Man 1908.
***savuensis** de Man 1908.
*Miersi Cout. 1905.
distinguendus de Man 1909.
Halesii Kirk 1887.
***rapacida** de Man 1908.
***lepidus** de Man 1908.
rapax Cout. 1905.
***Sibogae** de Man 1908.
***acutocarinatus** de Man 1909.
*macrosceles Alc. & Anders 1894.

V. *Edwardsi* group.

bis-incisus de Haan 1849.
bis-incisus de Haan. var. Malensis Cout. 1905.
*bis-incisus de Haan. var. **variabilis** de Man 1909.
***proseuchirus** de Man 1908.
***Coutierei** de Man 1909.
hoplocheles Cout. 1898.
Bouvieri A. M.-Edw. 1878.
*leviusculus Dana. 1852.
Bastardi Cout. 1905.
*Euphrosyne de Man 1897.
*microrhynchus de Man 1897.
japonicus Miers 1879.
Edwardsi Aud. 1826.
*Audouini Cout. 1905.
*chiragricus H. M.-Edw. 1837.
*crassimanus Heller 1865.
*pareuchirus Cout. 1905.
*pareuchirus Cout. var. **Leucothea** de Man 1909.
leptochirus Cout. 1905.
***leptochiroides** de Man 1909.
***Polyxo** de Man 1909.
*strenuus Dana 1852.
strenuus Dana var. angulatus Cout. 1905.
*pareuchirus Cout. var. **imitatrix** de Man 1909.
bis-incisus de Haan var. stylirostris Cout. 1905.
Bouvieri A. M.-Edw. var. Hululensis Cout. 1905.
Maindroni Cout. 1898.
*pacificus Dana 1852.
Haanii Ortm. 1890.
macrodactylus Ortm. 1890.
malabaricus Fabr. 1798.
malabaricus Fabr. var. dolichodactylus Ortm. 1890.
*malabaricus Fabr. var. **leptopus** de Man 1910.
*parvi-rostris Dana 1852.
hoplites Nob. 1906.
*Hippothoë de Man 1888.
*euchirus Dana 1852.
euchiroides Nob. 1906.
funafutensis Borr. 1898.
*edamensis de Man 1888.
Perezi Cout. 1908.
*sp. de M. (near parvi-rostris Dana) 1911.
lobidens de Haan 1849.

Classification of the Species.

As the result of his important researches COUTIÈRE has proposed the very natural division of the genus *Alpheus* Fabr. into five groups: *Megacheles*, *Macrochirus*, *Crinitus*, *Brevirostris* and *Edwardsi*, the third of which is again subdivided into three subgroups: *Obeso-manus*, *Crinitus* s. s. and *Insignis* (H. COUTIÈRE, Les Alphéidae, 1899, p. 351 and in: Alpheidae Mald. and Laccadive Archipelagoes 1905). These groups are characterized by him in the following way.

Megacheles group.

Lateral (extra-corneal) spines present. Larger chela more or less distorted with the margins grooved and notched and with the condylian crests very prominent and sharp: merus of 3rd legs dentate or unarmed, dactyli of three posterior legs simple or biunguiculate.

Macrochirus group.

Lateral (extra-corneal) spines usually present. Inferior spine of basicerite sometimes large. Larger chela usually longitudinally grooved or emarginate anteriorly. Merus of third legs usually unarmed, dactyli of three posterior legs biunguiculate or simple. External spine of exopod of caudal fan often black.

Crinitus group.

Lateral (extra-corneal) spines usually wanting. Larger chela more or less cylindrical, entire or with the upper border transversely grooved or with the alpheopsial grooves well marked, in the latter case the dactylus is hammer-shaped. Merus of third legs usually dentate. Dactyli of three posterior legs usually simple.

Obeso-manus subgroup.

Lateral (extra-corneal) spines wanting. Larger chela with the alpheopsial grooves well-developed and with the dactylus hammer-shaped. Merus of third legs very rarely unarmed. Dactyli of three posterior legs usually simple.

Crinitus subgroup.

Lateral (extra-corneal) spines wanting. Larger chela cylindrical, entire, without grooves or notches. Merus of third legs very rarely unarmed. Dactyli of three posterior legs simple or biunguiculate.

Insignis subgroup.

Lateral (extra-corneal) spines usually wanting. Larger chela with a transverse groove near the articulation of the dactylus or not. Merus of third legs dentate or unarmed. Dactyli of three posterior legs simple.

Brevirostris group.

Lateral (extra-corneal) spines wanting. Larger chela quadrangular, compressed, often with longitudinal ridges, with a transverse groove near the articulation of the dactylus or not; dactylus of larger chela of the male sometimes "Balaeniceps"-shaped. Merus of third legs usually unarmed. Dactyli of three posterior legs simple, lanceolate.

Edwardsi group.

Lateral (extra-corneal) spines wanting, very rarely (*A. hoplites*) orbital hoods acute. Larger chela usually more or less compressed, with both the upper and the lower margin emarginate and with grooves or depressions on the lateral surfaces. Dactylus of smaller chela of the male often "Balaeniceps"-shaped, rarely also that of the female. Merus of third legs unarmed or dentate. Dactyli of three posterior legs simple, very rarely (*A. hoplites*, *A. Polyxo*) biunguiculate.

Key to the indopacific species and varieties of the genus *Alpheus* Fabr

Megacheles group.

a_1 Merus of 3rd legs unarmed.

b_1 Dactylus of 3rd and following legs simple.

c_1 Merus of 3rd legs 5-times longer than wide. Fingers of the smaller chela slightly shorter than the palm, which is 2,43-times as long as high . . . . . *staphylinus* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 14).

c_2 Merus of 3rd legs 9,5-times longer than wide. Inner margin of the merus of the larger cheliped with 4—6 small spinules posterior to the spine at distal extremity. Fourth article of carpus of 2nd legs usually as long as the 2nd and as long as the 5th. Fingers of the smaller chela slightly longer than the palm. Larger chela in the male 2,58-times, in the female 2,76-times as long as high . . . . . *Hailstonei* Cout. var. *assimulans* de Man

c_3 Merus of 3rd legs 11-times longer than wide [1]). Inner margin of the merus of the larger cheliped unarmed posterior to the spine at distal extremity. Fourth article of carpus of 2nd legs as long as the 2nd and as long as the 5th. Fingers of smaller chela slightly shorter than the palm. Larger chela 3,33-times as long as high . . . . . *Hailstonei* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 879, Pl. LXXIV, fig. 18).

1) This proportion is deduced from the figure.

b_2 Dactylus of 3rd and following legs biunguiculate.

c_1 Merus of 3rd legs in the male 8-times, in the female 6,6-times as long as wide. Inner margin of the merus of larger cheliped with 8 or 9 spinules posterior to the spine at distal extremity. Fourth carpal article of 2nd legs shorter than 2nd and also than 5th. Fingers of the smaller chela a little shorter than the palm. Larger chela nearly as in *A. Hailstonei* Cout. . . . . *Hailstonei* Cout. var. *laetabilis* de Man

c_2 Merus of 3rd legs 3-times as long as wide. Fourth carpal article of 2nd legs somewhat less than half as long as 2nd and also shorter than the 5th. Fingers of the smaller chela shorter than the palm. Larger chela with the palm ovoid, the immobile finger truncate and the dactylus falcate; lower margin crenulate. . . *Seurati* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 881, Pl. LXXV, fig. 20).

a_2 Merus of 3rd legs with a spiniform tooth at distal extremity. Fourth carpal article of 2nd legs half as long as the 2nd and shorter than the 5th (also in *A. Malhaensis*?).

b_1 Dactylus of 3rd and following legs simple. Fingers of the smaller chela hardly more than half as long as the palm, the latter one and a half as long as high . . . . . *deuteropus* Hilgd.

(F. HILGENDORF, in: Monatsb. Berl. Akad. Wiss. 1878, p. 834, Taf. IV, Fig. 8).

b_2 Dactylus of 3rd and following legs biunguiculate (also in *A. Malhaensis*?).

c_1 Merus of 3rd legs less than 4-times as long as wide.

d_1 Immobile finger of the large chela not truncate. Fingers of the smaller chela of the male as long or slightly longer than the palm, which is 1,4-times as long as high . . . . . *collumianus* Stimps.

d_2 Larger chela as in *A. Seurati*, but the lower margin smooth, the constriction between the palm and the immobile finger deeper and the extremity of the dactylus less massive. Measurements of 3rd legs: merus 1,9, carpus 1, propodus 1,25 . . . . . *Malhaensis* Cout.[1])

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris 1908, p. 15).

c_2 Merus of 3rd legs about 6-times as long as wide. Fingers of the smaller chela slightly longer than the palm, which is twice as long as high and armed with two acute teeth at the anterior margin. Larger chela 3-times as long as high. Carpus of 3rd legs with 3 movable spinules. . . . . *paradentipes* Cout.

The position of an unnamed species, described by COUTIÈRE (in: Alpheidae Mald. and Laccad. Archip. 1905, p. 882, Pl. LXXIV, fig. 19), is doubtful and therefore this species is not included in the key of this group.

1) This species is rather incompletely known. In the short diagnosis nothing is said about the merus of the larger cheliped, about the smaller cheliped, the three last carpal articles of 2nd legs and about the dactyli of the three posterior legs.

Macrochirus group.

a_1 Merus of 3rd and 4th legs with an acute tooth at the distal extremity of posterior margin.

b_1 Lateral (extra-corneal) teeth present, very small. Between either of them and the rostrum the frontal margin bears another still smaller tooth. An acute median tooth on the rostral carina at the base of the eye-hoods. Carapace villose . . . . . *villosus* (Oliv.)

(H. MILNE-EDWARDS, in: Hist. Nat. Crust. II, 1837, p. 354).

b_2 Lateral (extra-corneal) teeth wanting.

c_1 Dactyli of three posterior legs biunguiculate. Lower spine of basicerite reaching almost to the extremity of median article. Lower border of the large chela notched, upper border without a transverse groove. First carpal article of 2nd legs more than twice as long as 2nd . . . . . *paragracilis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 883, Pl. LXXVI, fig. 22).

c_2 Dactyli of three posterior legs simple. Basicerite almost unarmed. Lower border of larger chela entire, upper border with a transverse groove. First carpal article of 2nd legs about one-third of 2nd.

d_1 Longitudinal groove on the supero-external surface of larger chela well-developed, deep. Fingers of the small chela much shorter than the palm . . . . . *acuto-femoratus* Dana

d_2 Longitudinal groove on the supero-external surface of larger chela very feeble. Fingers of the small chela as long as the palm. *Amirantei* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 15).

a_2 Merus of 3rd and 4th legs unarmed.

b_1 Lateral (extra-corneal) teeth present.

c_1 Dactyli of three posterior legs biunguiculate.

d_1 Inferior spine of basicerite small, hardly reaching to the extremity of 1st antennular article.

e_1 Larger chela not emarginate anteriorly, dactylus not hammer-shaped. Scale of scaphocerite not rudimentary, reaching to or almost to the extremity of antennular peduncle.

f_1 Larger chela not or quite indistinctly notched at the base of the immobile finger. Rostrum reaching to the middle of the visible part of 1st antennular article. Movable spine of exopod of caudal fan brown. First carpal article of 2nd legs only slightly longer than the sum of the 2nd and the 3rd. *gracilis* Heller

(C. HELLER, in: Sitzungsber. Akad. Wiss. Wien, XLIV, 1861, p. 271, Taf. III, Fig. 19, 20).

f_2 Larger chela more distinctly notched at the base of the immobile finger. Rostrum reaching to the extremity of 1th antennular article. Movable spine of exopod of caudal fan black . . . . . *gracilis* Heller var. *luciparensis* n.

e_2 Larger chela emarginate anteriorly, dactylus hammer-shaped. Scale of scaphocerite rudimentary, hardly reaching to the middle of 2nd antennular article. First carpal article of 2nd legs distinctly longer than the sum of the three following. Movable spine of exopod of caudal fan black . . . . *architectus* de Man

(J. G. DE MAN, in: Zool. Jahrb. Abth. f. Syst. IX, 1897, p. 726, Pl. 34, Fig. 60).

d_2 Inferior spine of basicerite reaching almost to the end of 2nd antennular article. Larger chela with the upper border longitudinally grooved. First carpal article of 2nd legs a little shorter than the sum of the two following . . . . . *socialis* Heller

(C. HELLER, Crustaceen der Novara-Reise 1865, p. 106, Pl. X, fig. 1).

c_2 Dactyli of three posterior legs simple.

d_1 Rostrum triangular, flattened above and separated by deep sulci from the orbital hoods. Dactyli of three posterior legs obtuse. Large chela without grooves or furrows . . . . *ventrosus* H. M.-E.

d_2 Rostral carina not flattened above, rarely wanting at all. Dactyli of three posterior legs acute.

e_1 Rostral carina distinct; 1st carpal article of 2nd legs much shorter than the sum of the four following. Larger chela 3-times, smaller 5-times as long as high.

f_1 Lateral (extra-corneal) teeth arising from the anterior margin of the front; between these teeth on either side of the rostrum an arcuate prominence. Large chela with the upper border conspicuously longitudinally grooved on the inner side . . . . . *facetus* de Man

f_2 Lateral (extra-corneal) teeth arising from the upper surface of the eye-hoods, no prominence on either side of the rostrum; the longitudinal groove on the upper border of the palm much less distinct than in *A. facetus* . . *splendidus* Cout.

(H. COUTIÈRE, Bull. Mus. Paris, 1897, N° 6, p. 235).

e_2 Rostrum minute, not longer than the equally acute extra-corneal spines, not produced backward as a carina. First carpal article of 2nd legs longer than the sum of the four following. In the larger chela the socket in the fixed finger and the plug-like tubercle of the dactylus that fits into it, are entirely wanting. A deep-sea species. . . *Shearmei* Alc. & Anders.

(A. ALCOCK, Descript. Catal. Indian Deep-Sea Crustacea. Calcutta 1901, p. 141).

b_2 Lateral (extra-corneal) teeth wanting.

c_1 Dactyli of three posterior legs biunguiculate.

d_1 Orbital hoods rounded anteriorly, rostrum triangular, flattened above, with the lateral margins setose. Larger cheliped with the upper margin of the merus obtuse at apex . . . . . *macrochirus* Richt.

d_2 Orbital hoods acute in front, rostrum continued backward as a short keel on the carapace. Larger cheliped with the upper margin of the merus terminating in a large spine . . . . *aglaopheniae* Borr.

(L. A. BORRADAILE, in: A. Willey's Zool. Results, Part IV, 1899, p. 417, Fig. 13*a*—13*f*).

c_2 Dactyli of three posterior legs simple. Orbital hoods hemispherical, convex. Rostral carina prominent, reaching to just behind the orbital hoods. Larger chela 3,5-times as long as high, with the fingers extraordinarily short and the dactylus hammer-shaped . *idiocheles* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 883, Pl. LXXV, fig. 21).

In his paper on the Alpheidae of the Mald. and Laccad. Archip. 1905, p. 882, Prof. COUTIÈRE makes mention with a few words of a variety *Alluaudi* of *A. gracilis* Heller, which only should differ from the type by the dactyli of the three posterior legs being simple. It is not included in this key, because in COUTIÈRE's specimens the first pair of legs were wanting.

Obeso-manus subgroup.

a_1 Merus of 3rd legs armed with an acute tooth at distal extremity of posterior margin.

b_1 Dactyli of three posterior legs simple.

c_1 Terminal spine of scaphocerite reaching at least to the extremity of 2nd antennular article, this article at most 3-times as long as thick; 2nd carpal article of 2nd legs more than 3-times as long as 1st, rarely only twice as long or still less.

d_1 Fingers of the small chela of the male much shorter than the palm, the proportion between the length of the chela and that of the fingers more than 3.

e_1 Larger chela not furrowed at all; 2nd carpal article 4-times as long as 2nd; fingers of smaller chela one-fourth the whole length . . . . . *obeso-manus* Dana

(J. D. DANA, U. S. Explor. Exp. Crust. p. 547, Pl. 34, fig. 7).

e_2 Larger chela distinctly furrowed; 2nd carpal article 3,3—3,4-times as long as 2nd; proportion between the length of the smaller chela of the male and that of the fingers 3,15 . . *microstylus* (Sp. Bate)

d_2 Fingers of the small chela of the male little shorter than the palm, the proportion between the length of the chela and that of the fingers less than 3.

e_1 Second carpal article of longer leg more than 3-times as long as 2nd. Telson elongate, 6—7-times as long as the posterior margin is wide.

f_1 Scale of scaphocerite not rudimentary, reaching a little beyond 2nd antennular article. Second carpal article of longer leg 4,3-times as long as 1st and 14-times (in the typical species 8-times) as long as thick in the middle . . . . *microstylus* (Sp. Bate) var.

f_2 Scale of scaphocerite rudimentary, reaching to the middle of 2nd antennular article. Second carpal article of the longer leg more than 3,5-times as long as 1st. Larger chela quite as in *A. microstylus* (Sp. Bate) . . . . . *Lutini* Cout.

e_2 Second carpal article of longer leg twice or less than twice as long as 1st.

f_1 Second carpal article twice as long as 1st. *obeso-manus* Dana var. *japonicus* Ortm.
(A. Ortmann, in: Zoolog. Jahrb. Abth. f. Syst. V, 1890, p. 478).

f_2 Second carpal article 1,13-times as long as 1st. Telson a little more than 3-times as long as the posterior margin is wide . . . . . *persicus* Nob.
(G. Nobili, in: Bull. Scientif. France et Belgique, 1906, p. 33).

c_2 Terminal spine of scaphocerite not reaching to the apex of 2nd antennular article, this article more than 4-times as long as thick in the middle; 2nd carpal article of 2nd legs not more than one and a half as long as 1st.

d_1 Carpocerite reaching at least to the apex of 2nd antennular article.

e_1 Terminal spine of scaphocerite only a little shorter than 2nd antennular article.

f_1 Fourth carpal article of 2nd legs 3,4—3,9-times as long as thick. Merus of 3rd legs 3,7—4-times, carpus 4,4—5-times as long as wide in the middle . . . . . *malleodigitus* (Sp. Bate)

f_2 Fourth carpal article of 2nd legs 5—5,6-times as long as thick. Merus of 3rd legs 4,3—4,5-times, carpus 5,6—5,8-times as long as wide in the middle . . . . . *malleodigitus* (Sp. Bate) var. *gracilicarpus* de Man

e_2 Terminal spine of scaphocerite reaching to the middle of 2nd antennular article. Telson 4,5-times as long as the posterior margin is wide. Merus of 3rd legs 4,4-times as long as wide in the middle. . . . . *phrygianus* Cout.
(H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 886, Pl. LXXVII, fig. 25).

d_2 Carpocerite as long as the terminal spine of scaphocerite, reaching to the middle of 2nd antennular article; telson almost 4-times

as long as the posterior margin is wide. Merus of 3rd legs 5-times as long as wide in the middle . . . . . *Danae* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 887, Pl. LXXVII, fig. 26).

b_2 Dactyli of 3rd and 4th legs with a small accessory tooth on the posterior margin. Second antennular article 2,5-times as long as thick. Terminal spine of scaphocerite as long as carpocerite, a little shorter than antennular peduncle. Telson 4,375-times as long as the posterior margin is wide. Merus of 3rd legs 4-times as long as wide in the middle, apical tooth rather small . . . . . *Alpheus* sp.

a_2 Merus of 3rd legs unarmed, 3,6-times as long as wide in the middle. Larger chela 5,5-times as long as high. Second carpal article of 2nd legs only a little longer than 1st . . . . . *baculifer* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 16).

Crinitus subgroup.

a_1 Merus of 3rd legs with an acute tooth at the apex of posterior margin.

b_1 Dactyli of three posterior legs biunguiculate.

c_1 Scale of scaphocerite extending at least to the extremity of 2nd antennular article.

d_1 Basicerite unarmed, posterior margin of 6th abdominal somite devoid of spines in the middle.

e_1 Internal posterior margin of merus of 3rd legs armed with several movable spinules. Fingers of smaller chela shorter than the palm. Second legs slender, 2nd carpal article more than 3-times as long as 1st . . . . . *Alcyone* de Man

e_2 Internal posterior margin of merus of 3rd legs unarmed, glabrous. Fingers of smaller chela shorter than the palm. Second legs slender, 2nd carpal article 1,95-times as long as 1st . *Providencei* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 18).

d_2 Basicerite unarmed, posterior margin of 6th abdominal somite with an acute, median tooth in the middle.

Fingers of smaller chela longer than the palm. Second legs stout, 2nd carpal article about one and a half as long as 1st . . . *Arethusa* de Man

d_3 Basicerite with a short, though distinct spine at the lower side. Posterior margin of 6th abdominal somite with two small spines in the middle.

Fingers of smaller chela just as long as the palm. Second legs slender, 2nd carpal article 2,43—2,46-times as long as the 1st. Internal posterior margin of merus of 3rd legs without spinules. *paralcyone* Cout.

c_2 Scale of scaphocerite not yet reaching to the middle of 2nd antennular article.

Basicerite unarmed. Fingers of smaller chela shorter than the palm. Second legs slender, 2nd carpal article 2,5—3-times as long as the 1st. Internal posterior margin of merus of 3rd legs armed with 20—30 spinules . . . . . *paraculeipes* Cout.

b_2 Dactyli of three posterior legs simple.

c_1 First carpal article of 2nd legs shorter than 2nd.

d_1 Fingers of the small chela in the male shorter than the palm; rarely (*A. consobrinus* de Man) longer than the palm, in this case the dactylus much broadened.

e_1 Orbits acute in front, with their apices curved inward.

Basicerite unarmed. Fingers of smaller chela short, dactylus not enlarged. Second carpal article of 2nd legs twice as long as 1st *brevipes* Stimps.

(W. STIMPSON, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 30).

e_2 Orbits rounded anteriorly, at least not acute.

f_1 Second carpal article of 2nd legs hardly longer than 1st.

Rostral carina short. Fingers of smaller chela a little shorter than the palm. Merus of 3rd legs 4-times as long as wide in the middle. Terminal spine of scaphocerite a little shorter than the carpocerite and than the antennular peduncle . *crinitus* Dana

(J. D. DANA, U. S. Explor. Exp. Crust. p. 548, Pl. 34, fig. 8).

f_2 Second carpal article of 2nd legs at least one and a half as long as 1st; when less than one and a half, the merus of 3rd legs 2,75-times as long as wide (female of *A. bradypus* Cout.) or the rostral carina continued beyond the middle (*parvus* de Man).

g_1 Rostral carina continued backward to beyond the middle of the carapace.

Scale of scaphocerite as long as antennular peduncle.

h_1 Carpus of 3rd legs armed with 3 or 4 spinules on its anterior margin, with 2 or 3 on its posterior. Terminal spine of scaphocerite as long as or slightly longer than the carpocerite. Second carpal article 1,6-times as long as the 1st. . . . . *bucephaloides* Nob.

(G. NOBILI, in: Bull. Scientif. France et Belgique, XL, 1906, p. 29).

h_2 Carpus of 3rd legs bearing three spinules on its posterior margin, but no ones on the anterior. Fingers of smaller chela, in the female, much shorter than the palm. Second carpal article twice as long as the 1st. *longecarinatus* Hilgd.

(F. HILGENDORF, in: Monatsber. Akad. Wiss. Berlin, 1878, p. 833, Taf. IV, fig. 3—7).

h_3 Carpus of 3rd legs devoid of spinules both on the anterior and the posterior border. Fingers of smaller chela, in the female, hardly shorter than the palm, merus of smaller cheliped with a strong, slender, apical tooth at the infero-internal margin. Second carpal article 1,28-times longer than 1st . . . . . *parvus* de Man

g_2 Rostral carina short, hardly reaching backward beyond the orbital hoods.

h_1 Scale of scaphocerite as long as antennular peduncle.

i_1 Dactylus of smaller chela in the male conical, not enlarged, measuring $^7/_8$ of the palm. Second carpal article more than twice as long as 1st. Length of telson in proportion to the width of its posterior margin as 9 : 4 . . . . . *bucephalus* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 890, Pl. LXXVIII, fig. 29).

i_2 Dactylus of smaller chela in the male much broadened, half as broad as long, fingers slightly longer than the palm. Second carpal article in the male almost 3-times, in the female somewhat more than twice as long as the 1st . . . . . *consobrinus* de Man

h_2 Scale of scaphocerite rudimentary, shorter than 2nd antennular article.

i_1 Second carpal article in the male 1,75-times, in the female 1,4-times as long as 2nd. Merus of 3rd legs 2,75-times as long as wide in the middle. Merus of smaller cheliped both in the male and in the female one and a half as long as wide. . . . . *bradypus* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 891, Pl. LXXVIII and LXXIX, fig. 30).

i_2 Second carpal article twice or a little more than twice as long as 1st. Merus of 3rd legs 5-, sometimes only 4-times as long as wide in the middle; internal posterior margin with 20—25 short setae, external with 3—8 longer ones. Dactyli of three posterior legs sometimes with a more or less distinct, accessory hook. Perhaps a variety of *A. paraculeipes* Cout. *spongiarum* Cout.

d_2 Fingers of smaller chela in the male longer than the palm, styliform. Scale of scaphocerite rudimentary, reaching at most to the middle of 2nd antennular article. Second legs stout. Posterior margin of 6th abdominal somite unarmed in the middle.

e_1 Frontal margin of carapace transverse at either side of the

rostrum which is very short. Merus of 3rd legs 4,1-times as long as wide in the middle, merus of 4th legs unarmed. . *Eulimene* de Man

e_2 Rostrum not short, reaching beyond the middle of basal antennular article, frontal margin at either side oblique, convex. Merus of 3rd legs 3-times as long as wide in the middle, merus of 4th also with a tooth . . . . . *styliceps* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 889, Pl. LXXVIII, fig. 28).

c_2 First carpal article of 2nd legs not shorter than 2nd.

d_1 Fingers of smaller chela in the male shorter than the palm.

e_1 First carpal article hardly longer than 2nd. Merus of 3rd legs at most 3,5-times as long as wide in the middle.

f_1 Rostrum triangular, small, concave, curved upward, not carinate; rostral carina arising, just behind the rostrum, at the level of the anterior border of the eye-hoods. Dactylus of smaller chela in the male much enlarged, twice as long as broad. Merus of 3rd legs almost 3,5-times as long as wide in the middle . . . . . *clypeatus* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 897, Pl. LXXXI, LXXXII, fig. 36).

f_2 Rostrum very small, rostral carina not interrupted, running, as in *A. Alcyone*, from the tip of the rostrum backward. Dactylus of smaller chela in the male not enlarged. Merus of 3rd legs 3-times as long as wide in the middle. . . *tryphopus* Nob.[1])

(G. NOBILI, Ricerche sui Crostacei della Polinesia, Torino, 1907, p. 355).

e_2 First carpal article at least one and a half as long as 2nd. Merus of 3rd legs about 4-times as long as wide in the middle.

f_1 Rostrum well developed, reaching to the middle of visible part of basal antennular article; the frontal margin appearing at either side of the rostrum as a semicircular lobe, bearing 7 or 8 long setae. Carpus of 3rd legs with three spinules on the middle of posterior margin . . . . . *superciliaris* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 896, Pl. LXXXI, fig. 35).

f_2 Frontal margin presenting a convex prominence at either side of the middle, the two prominences separated by a median sinus, below which the very short rostrum is situated. Small chela of the male 3-times as long as high. Merus of 3rd legs 4-times as long as wide in the middle. *Adamastor* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 19).

1) The position of this species, which was regarded by the late Dr. NOBILI as a variety of *A. Alcyone*, is doubtful, because it is unknown whether the 1st carpal article of 2nd legs is really longer than the 2nd or not, as also because only the female is known.

f_3 At either side of the minute rostrum the frontal margin runs transversely outward, the front appearing truncate. Dactylus of smaller chela in the male broadened, half as broad as long, a little shorter than the palm. Merus of 3rd legs almost 4-times as long as wide in the middle, carpus without spinules on the posterior margin . . . *pachychirus* Stimps. (young specimens)

d_2 Fingers of smaller chela in the male not shorter than the palm.

e_1 Dactylus of smaller chela in the male enlarged, half as broad as long. First carpal article of 2nd legs one and a half to almost twice as long as 2nd. At either side of the minute rostrum the frontal margin appears truncate . . . . . *pachychirus* Stimps. (adult specimens)

e_2 Fingers of smaller chela in the male just as long as the palm, gaping, their infero-external border excavate and fringed with short setae. Dactylus tapering, not broadened. First carpal article but a little longer than 2nd. Merus of 3rd legs 5- or almost 5-times as long as wide in the middle.

f_1 Merus of 4th legs armed with an apical tooth like that of 3rd . . . . . *Stanleyi* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 17).

f_2 Merus of 4th legs quite unarmed at apex, 5,2—5,6-times as long as wide in the middle . . . . *Stanleyi* Cout. var. *dearmatus* de Man

a_2 Merus of 3rd legs unarmed at apex.

b_1 Rostrum well developed, reaching to the middle of basal antennular article, continued backward as a short and strong carina . . . *ovaliceps* Cout.

(H. COUTIÈRE: Alpheidae Mald. and Laccad. Archip. 1905, p. 888, Pl. LXXVII, fig. 27).

b_3 Rostrum wanting at all, front truncate . . . . . *frontalis* H. M.-Edw.

Insignis subgroup.

a_1 Merus of 3rd legs with an acute tooth at apex.

b_1 Larger chela with a transverse groove near the articulation of the dactylus.

c_1 On either side of the rostral carina, at the base of the eye-hoods, a pointed tooth, flattened at its base; interorbital part of the rostral carina strongly compressed, acute, with a small, obtuse tubercle at the level of these lateral teeth.

d_1 Rostral carina, behind the median tubercle, gradually fading away, not bounded on either side by a shallow groove or depression. *bidens* (Oliv.)

d_2 Rostral carina, behind the median tubercle, continued in a straight, obtuse crest, bounded on either side by a shallow groove or depression that ends abruptly at the posterior extremity of the crest . . . . . *praedator* de Man

c_2 No pointed tooth on either side of the rostral carina, at the base of the eye-hoods.

d_1 Frontal margin at either side with a slender spine.

e_1 Rostral carina armed with two spines, situated behind one another, rostral carina prominent, reaching to the posterior third of the carapace . . . . . *cristatus* Cout.

(H. COUTIÈRE, in: Bull. Mus. Paris, 1897, N° 7, p. 303).

e_2 Rostral carina little prominent, without the spines characteristic of *A. cristatus*, but with a minute tubercle, just behind the level of the base of the eye-hoods. Midway between this tubercle and the frontal margin on either side a lamellar crest with rather sharp edge runs obliquely backward . . . . *bicostatus* de Man

d_2 No spine on frontal margin at either side of the rostrum.

e_1 Orbital hoods not regularly rounded; frontal margin with a prominence at either side of the rostrum; rostrum arising from a broad flattened base between the orbital hoods, the margins of which base are concave.

f_1 The flattened base from which the rostrum arises, is distinctly carinate, with a minute tubercle posteriorly; a broad arcuate and setiferous prominence between the obtuse tips of the eye-hoods and the rostrum . . . . . *insignis* Heller

f_2 The flattened base from which the rostrum arises, not carinate; a very small, acute prominence at either side of the rostrum. *diadema* Dana

(J. D. DANA, U. S. Explor. Exp. Crustacea, p. 555, Pl. 35, fig. 7).

e_2 Orbital hoods rounded anteriorly, frontal margin without a prominence at either side of the rostrum.

f_1 Rostrum lanceolate, as in *A. gracilipes*, the margins overhanging the rostro-orbital furrows. Dactylus of small chela of the male "Balaeniceps"-shaped . . . . . *Percyi* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 21).

f_2 Interorbital carina rather sharp anteriorly, obtuse posteriorly. Second legs more slender than those of *A. Miersi*, 2nd carpal segment one and a half as long as the 1st and 8-times as long as thick; 4th segment one and a half as long as the 5th. Merus of 3sd legs 5-times longer than wide, armed, as in *A. Lanceloti*, with 4 movable spinules on the posterior margin, the apical tooth rather small . . . . *Philoctetes* de Man

b_2 Larger chela without a transverse groove near the articulation of the dactylus. Rostrum as in *A. gracilipes*, triangular, flattened above, arising from between the bases of the eye-hoods, with the margins overhanging the rostro-orbital furrows.

c_1 First carpal article of 2nd legs hardly half the 2nd in length . . *pugnax* Dana

(J. D. DANA, U. S. Explor. Exp. Crustacea, p. 554, Pl. 35, fig. 6).

c_2 First carpal article of 2nd legs 1,2-times as long as 2nd. Rostrum 1,5-times as long as wide at its base, with a trace of a gastric spine in the mid-line . . . . . *dasycheles* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 21).

a_2 Merus of 3rd legs with no tooth at distal extremity of posterior margin.

b_1 Larger chela with a transverse or oblique groove on the upper border near the articulation of the dactylus.

c_1 Rostral carina more or less obtuse, not arising from a triangular, flattened base between the eye-hoods.

d_1 Second carpal article 1,12-times as long as 1st. Merus of 3rd legs a little more than 4-times as long as wide, bearing 3 movable spinules on the middle of posterior margin. Larger chela with a transverse furrow . . . . . *Lanceloti* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 900, Pl. LXXXIII, fig. 39).

d_2 First carpal article 2—2,44-times longer than 2nd. Merus of 3rd legs quite unarmed. Upper border of the larger chela with a narrow groove anteriorly, running obliquely inward, though not continued on the inner surface of the palm . . . . . *Ehlersi* de Man

(J. G. DE MAN, in: Proc. Zool. Soc. London 1909, p. 663, Pl. LXX).

c_2 Rostrum arising from a triangular, flattened base between the eye-hoods, separated from the latter by deep grooves.

d_1 Frontal margin with an almost vertical prominence just before and at the inner side of the obtuse tips of the eye-hoods. . *gracilipes* Stimps.

d_2 Frontal margin straight. Larger chela thicker than that of *A. gracilipes* . . . . . *novae-zelandiae* Miers

(E. J. MIERS, Catalogue of the Stalk- and Sessile-eyed Crustacea of New Zealand, London 1876, p. 82, Pl. II, fig. 2).

b_2 No transverse or oblique groove on the upper border of the larger chela.

c_1 Orbital hoods terminating in flattened spines ("épines plates") reaching to the middle of 2nd antennular article. Larger and smaller chela quite as in *A. paracrinitus* Miers var. *bengalensis* Cout., 1st carpal article of 2nd legs 1,7-times as long as 2nd. Third legs more slender than those of *A. paracrinitus* . . . . . *Coetivensis* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 20).

c_2 Orbital hoods rounded or obtuse.

d_1 Larger chela of a stout shape, only 2,2-times as long as high. Carpocerite as long as antennular peduncle, shorter than the scaphocerite. First carpal article as long as 2nd . . . . . *mitis* Dana

(J. D. DANA, U. S. Explor. Exp. Crustacea, p. 549, Pl. 35, fig. 1).

d_1 Larger chela 3- or 4-times as long as high.

e_1 Telson at most 3-times as long as its posterior margin is wide. Rostrum not prolonged backward as a dorsal carina.

f_1 Terminal spine of scaphocerite extending far beyond the scale, terminal spine reaching almost to or even slightly beyond the tip of carpocerite. Rostrum about 3-times as long as wide in the middle, reaching almost to the extremity of 1st antennular article.

g_1 Smaller chela with a spine near the articulation of the dactylus. First carpal article 1,75—1,85-times as long as 2nd. . . . . *paracrinitus* Miers

(E. J. MIERS, in: Annals Mag. Nat. Hist. 1881, p. 365, Pl. XVI, fig. 6).

g_2 Smaller chela with no spine near the articulation of the dactylus. First carpal article as long as 2nd . . . . *paracrinitus* Miers var. *bengalensis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 901, Pl. LXXXII, fig. 37).

f_2 Terminal spine of scaphocerite hardly reaching beyond the scale, much shorter than the carpocerite. Rostrum short and broad, hardly projecting beyond the orbital hoods. Larger chela 3,59—3,7-times as long as high . . . . *alpheopsides* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 901, Pl. LXXXIII, fig. 40).

e_2 Telson 4- or more than 4-times as long as its posterior margin is wide.

f_1 Merus of 3rd legs 5-times as long as wide. Rostrum slender, separated by rather deep notches from the orbital hoods. Terminal spine of scaphocerite longer than carpocerite . *paralpheopsides* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 902, Pl. LXXXIII, fig 41).

f_2 Merus of 3rd legs at least 7-times as long as wide.

g_1 Rostrum, as in *A. paralpheopsides* Cout., separated by deep notches from the orbital hoods. Larger chela of the male 3-times as long as high. Merus of 3rd legs 8-times as long as broad, propodus 1,2-times as long as the carpus . . . . . *tenuicarpus* de Man

g_2 Rostrum separated by shallow depressions from the orbits.

h_1 Larger chela 4-times as long as high. Merus of 3rd legs 7-times as long as wide, propodus 1,4-times as long as the carpus. Telson 4-times as long as the posterior margin is wide. . . . . sp. de Man

h_2 Larger chela of the female 4-times as long as high. Merus of 3rd legs 8,5-times as long as wide, propodus 1,44-times as long as the carpus. Telson as in *A. paralpheopsides*, but 4,8-times as long as the posterior margin is wide . . . . . *tenuipes* de Man

Brevirostris group.

a_1 Larger chela marked with a transverse groove near the base of the movable finger.

b_1 Fingers of smaller chela of the male at least one and a half as long as the palm.

c_1 Palm of smaller chela of the male longer than high, one and a half as long as high near the articulation of the fingers; fingers gaping, one and a half as long as the palm, slender, tapering, the dactylus with two longitudinal ridges fringed with hairs and meeting not far from the tip. Rostral carina hardly reaching to the base of the orbital hoods . . . . . *rapax* Fabr.

c_2 Palm of smaller chela of the male not longer than high (except in the variety *angustidigitus* of *A. brevirostris* (Oliv.); dactylus of this chela not "Balaeniceps"-shaped.

d_1 Rostral carina reaching almost to the middle of the carapace. Fingers of the small chela of the male somewhat more than twice as long as the palm, gaping, excavate at the inner side, the dactylus widened at its base.

e_1 Width or height of the dactylus of the small chela of the male, at its base, one-fourth of its length; carpocerite reaching to the apex of 2nd antennular article . . . . . *brevirostris* (Oliv.)

(Vide J. G. DE MAN, in: Mém. Soc. Zool. France, 1909, p. 153 and ff., Pl. VII, Fig. 15, 16).

e_2 Width or height of the dactylus of the small chela of the male, at its base, one-fifth of its length; carpocerite as long as the antennular peduncle . . . . . *brevirostris* (Oliv.) var. *angustidigitus* n.

d_2 Rostral carina hardly reaching to the base of the orbital hoods.

e_1 Fingers of larger chela but a little shorter than the palm. Fingers of smaller chela of the male in adult specimens 3,5-

times, in younger ones twice as long as the palm, slender, tapering, gaping, their inner margins fringed with hairs. . *brevicristatus* de Haan [1])

(W. DE HAAN, Fauna Japon. Crust. 1849, p. 177 *(A. malabaricus)*, Pl. XLV, fig. 1, vide also J. G. DE MAN, l. c. 1909, p. 152, 158).

e_2 Fingers of larger chela very short, hardly more than half as long as the palm, when measured horizontally, dactylus strongly curved. Fingers of smaller chela of the male almost twice as long as the palm, arcuate, gaping, not excavate internally, their margins fringed with long stiff hairs. . . *barbatus* Cout.

b_2 Fingers of smaller chela of the male at most one-third longer than the palm, dactylus "Balaeniceps"-shaped.

c_1 Merus of 3rd legs unarmed.

d_1 Merus of 3rd legs 5-times as long as wide.

e_1 Rostral carina not continued backward beyond the base of the orbital hoods, but the gastric region marked in the middle with a narrow, quite smooth band, on either side of which the surface is coarsely punctate.

f_1 Larger chela of the male 3-times, smaller chela 3,6-times as long as high, with a transverse groove near the base of the dactylus. Terminal spine of scaphocerite hardly reaching beyond the scale. . . . . *djeddensis* Cout.

(H. COUTIÈRE, in: Notes from the Leyden Museum, XIX, 1898, p. 202. Vide also J. G. DE MAN, l. c. 1909, p. 160, Pl. VIII, Fig. 25, 26).

f_2 Larger chela 2,5-times, smaller chela of the male 3-times as long as high, the latter with no transverse groove. Terminal spine of scaphocerite extending by one-fourth of its length beyond the narrow tip of the scale . . . *djiboutensis* de Man

(J. G. DE MAN, l. c. 1909, p. 160, Pl. VIII, fig. 17—24),

e_2 Rostral carina continued to the middle of the carapace, obtuse in the male, a little sharper in the female. Larger chela 2,4-times, smaller chela of the male 3,45-times as long as high, the latter with a transverse groove near the dactylus and with the fingers slightly longer than the palm. Carapace pubescent . . . . . *pubescens* de Man

d_2 Merus of 3rd legs 4-times as long as wide. Rostral carina almost inconspicuous posterior to the orbital hoods. Larger chela of the male 2,55-times, smaller chela 3-times as long

1) *Alpheus kingsleyi* Miers, in Proc. Zool. Soc. London, 1879, p. 54, ought probably to be considered as a young specimen of *A. brevicristatus*. An examination of the typical specimen in the British Museum showed the following. The rostral carina is not continued backward beyond the orbital hoods; the telson, grooved longitudinally, much resembles that of *A. distinguendus*. Larger chela with the lower margin of the palm narrow, that of the fingers rather sharp; merus, like that of the other cheliped, with the upper margin unarmed at apex. In the left leg of 2nd pair the 1st carpal article proved to be one and a half as long as the 2nd, in the right leg hardly longer than 2nd.

as high, the latter with no transverse groove near the dactylus, fingers slightly longer than the palm. . . . . *savuensis* de Man

c_2 Merus of 3rd legs with a small acute tooth at distal extremity, the merus 5-times as long as wide. Rostral carina not continued backward beyond the base of the orbital hoods. Larger chela of the male 2,5-times. smaller chela 4,6-times as long as high; the latter without transverse groove and with the fingers just as long as the palm . . . . . *Miersi* Cout.

a_2 Larger chela with no transverse groove near the base of the dactylus; dactylus of smaller chela of the male usually not "Balaeniceps"-shaped.

b_1 Palm of smaller chela of the male not longer than high, without transverse groove; fingers in adult specimens 2,5-times, in younger ones twice as long as the palm, gaping, excavate at the inner side, dactylus 5-times as long as high, not "Balaeniceps"-shaped. Rostral carina continued to the middle of the carapace. Merus of 1st legs with a spine at the apex of the upper margin . . . . . *distinguendus* de Man [1])

(W. DE HAAN, Fauna Japon. Crust. 1849, p. 177, Pl. XLV, fig. 2 (*A. rapax*) and J. G. DE MAN l. c. 1909, p. 155, Pl. VII, fig. 9—14).

b_2 Palm of smaller chela of the male distinctly longer than high, about one and a half times.

c_1 Rostrum small, extending back beyond the base of the eye-arch. Larger chela almost 4-times as long as high, with a very pronounced keel running down the centre of the back (outer face) of hand. Fingers of smaller chela of the male slightly longer than the palm, gaping . . . . . *Halesii* Kirk

(T. W. KIRK, in: Trans. New Zealand Institute, Vol. XIX, 1887, p. 194, Pl. VID, Fig. 1 and 2).

c_2 Rostral carina continued almost to the middle of the carapace, though it is already obtuse posterior to the orbital hoods. Larger chela of the male almost 4-times as long as high, without ridges on the outer surface. Smaller chela of the male with the fingers twice as long as the palm, dactylus not "Balaeniceps"-shaped . *rapacida* de Man

c_3 Rostrum continued in a narrow, sharp and prominent carina that extends backward to behind the middle of the carapace. Chela of the female 3-times as long as high. Second carpal article of 2nd legs twice or a little more than twice as long as 1st, 2nd article 10-times as long as thick (in *A. rapacida* 6-times). Merus of 3rd legs 6-times as long as wide (in *A. rapacida* 5-times) . *lepidus* de Man [2])

1) As a variety of this species ought perhaps to be regarded a female from the river near Pare-Pare, Celebes, described by me in: Max Weber's Zoolog. Ergebn. II, 1892, p. 404 and in: Mém. Soc. Zool. France, 1909, p. 156.

2) *A. lepidus* is inserted at this place with some doubt, because the smaller chela is unknown. It may, however, be recognized by the indicated characters.

c_4 Rostral carina? Larger chela of the male 2,46-times as long as high. Fingers of smaller chela of the male 1,33-times as long as the palm, gaping, fringed with long setae, but not excavate at the inner side; dactylus not "Balaeniceps"-shaped. Second carpal article of 2nd legs twice as long as 1st . . . . . *rapax* Cout. [1])

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 905).

b_3 Palm of smaller chela of the male 3- or more than 3-times as long as high.

c_1 Rostral carina sharp, continued to just behind the middle of the carapace and bearing, a little posterior to the orbital hoods, a small obtuse tubercle or prominence. Large chela of the male 3-times as long as high, palm almost 3-times as long as the fingers. Smaller chela of the male with the palm 3-times as long as high and hardly longer than the fingers, dactylus "Balaeniceps"-shaped. . . . . *Sibogae* de Man

c_2 Rostral carina prominent and sharp, extending almost to the posterior third of the carapace and bearing, just behind the orbital hoods, a small, obtuse tubercle or tooth. Larger chela of the male slender, 6-times longer than high, fingers slender, measuring three-fifths of the palm. Smaller chela of the male 9-times longer than high, palm a little longer than the fingers, dactylus "Balaeniceps"-shaped. . . . . *acutocarinatus* de Man

c_3 Rostral carina not continued backward beyond the base of the orbital hoods. Larger chela with the palm slender, subcylindrical, and gently tapering and with the dactylus only about one-third the length of the palm. Smaller chela about 6-times as long as high, with the palm equal in length to the fingers that are shutting together . . . . . *macrosceles* Alc. & Anders.

Edwardsi group.

a_1 Merus of 3rd legs unarmed.

b_1 Dactylus of the small chela of the male subspatulate in form, "Balaeniceps"-shaped; in the female the fingers are slender, straight.

c_1 Dactyli of three posterior legs simple.

d_1 Rostrum triangular, flattened above, arising from the base of the orbital hoods, from which it is separated by rather deep grooves.

e_1 Larger chela with the lower margin deeply notched, fingers but a little shorter than the palm.

1) This species has been, in my opinion, wrongly referred to *A. rapax* Sp. Bate (Challenger Macrura, p. 552, Pl. 99, fig. 1), because the fingers of the smaller chela of the male are but one-third longer than the palm and because the length of the carpal articles of the 2nd legs is also different; BATE's species seems to belong to *A. distinguendus* de Man.

f_1 Proportion between the length of the large chela and that of the fingers 2,2, according to COUTIÈRE, 2,5; this chela 2,5-times as long as high . . . . . *bis-incisus* de Haan

(W. DE HAAN, Fauna Japon. Crust. 1849, p. 179, Tab. XLV, fig. 3).

f_2 Proportion between the length of the large chela and that of the fingers 2,75; this chela about 2,5-times as long as high. Rostrum one and a half as long as wide at its base. *bis-incisus* de Haan var. *Malensis* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 910, Pl. LXXXVI, fig. 48).

f_3 Proportion between the length of the large chela and that of the fingers 2,6; this chela 2,4-times as long as high. Rostrum narrower than in the variety *Malensis*, sometimes not flattened above . . . . . *bis-incisus* de Haan var. *variabilis* de Man

e_2 Larger chela as in *A. pareuchirus* Cout., with the lower margin hardly emarginate, 3-times as long as high, the fingers measuring little more than one-fourth the length of the chela. Rostrum 3-times as long as wide at its base. Three posterior legs very slender . . . . . *proseuchirus* de Man

d_2 Rostrum not flattened above.

e_1 Rostrum sharply carinate above, with the narrow, prominent and compressed rostral carina running backward to beyond the posterior third of the carapace . . . . . *Coutierei* de Man

e_2 Rostral carina reaching at most to the base of the orbital hoods or just beyond it.

f_1 Both the larger and the smaller chela armed with a spiniform tooth at either side of the articulation of the dactylus. Merus of both chelipeds with a spine at the apex of infero-internal margin . . . . . *hoplocheles* Cout.

(H. COUTIÈRE, in: Notes from the Leyden Museum, XIX, 1898, p. 197).

f_2 No spiniform tooth at either side of the articulation of the dactylus of both the larger and the smaller chela.

g_1 Groove or depression on the supero-internal surface of the larger chela not triangular, but U-shaped, the margins perpendicular to the upper margin of the palm.

h_1 Rostral carina quite distinct, extending backward to just beyond the orbital hoods. Terminal spine of scaphocerite reaching almost with half its length beyond the tip of the rather narrow lamina. Merus of 3rd legs 3,5-times as long as wide . . . . *Bouvieri* A. M. E.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 907, Pl. LXXXV, fig. 44).

h_2 Rostral carina low, rounded, reaching to the posterior extremity of the eyes. Terminal spine of scaphocerite reaching with one-fourth of its length beyond the tip of the lamina. Merus of 3rd legs 5-times as long as wide . *leviusculus* Dana

h_3 Rostrum extremely short, not continued as a rostral carina. Terminal spine of scaphocerite hardly reaching beyond the rather broad scale. Merus of 3rd legs 4,5-times as long as wide . . . . . *Bastardi* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 907, Pl. LXXXV, fig. 45).

g_2 Groove or depression on the supero-internal surface of the larger chela triangular.

h_1 Merus of both chelipeds unarmed at the apex of infero-internal margin. Scaphocerite very broad, terminal spine not reaching beyond the rounded tip.

i_1 Palm of the small chela of the male 1,9-times, of the female 1,6-times as long as high; palm of the small chela of the male distinctly notched both on the upper and on the lower margin . . . . . *Euphrosyne* de Man

i_2 Palm of the small chela of the male 2,4-times, of the female 2,8-times as long as high; palm of the small chela of the male with both margins entire . . . *microrhynchus* de Man

h_2 Merus of larger cheliped with a spine at the apex of infero-internal margin.

i_1 Smaller chela of the male 8—9-times as long as high, larger chela 3-times. Lobes terminating the upper and the lower margin of the larger chela acute . . . . *japonicus* Miers

(E. J. MIERS, in: Proc. Zool. Soc. London, 1879, p. 53).

i_2 Smaller chela of the male less than 6-times as long as high.

k_1 Merus of 3rd legs 5- or less than 5-times as long as wide.

l_1 Smaller chela of the male 5-times as long as high, with the margins of the palm nearly entire.

m_1 Rostrum obtuse above, rather considerably widened backward. Lobes terminating the upper and the lower margin of the large chela acute . . . . *Edwardsi* Aud.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 912, Pl. LXXXVI, fig. 50).

m_2 Rostrum obtuse, rather considerably widened backward. Lobes terminating the upper and the lower margin of larger chela obtuse ("en ogive") . . . . . *Audouini* Cout.

m_3 Rostrum narrow, obtuse, subulate. Lobes terminating the upper and the lower margin of larger chela acute. . . . . *chiragricus* H. M. Edw.

l_2 Smaller chela of the male less than 4-times as long as high, with both margins distinctly notched; lobes terminating both margins of larger chela obtuse, rounded . . . . . *crassimanus* Heller [1])

k_2 Merus of 3rd legs more than 6-times as long as wide; rarely 5,4-times, but in this case the lower border of the larger chela hardly emarginate.

l_1 Smaller chela of the male of a rather stout form, the proportion between length and height being 4 or less, with an acute tooth at either side of the articulation of the dactylus.

m_1 Merus of 3rd legs in adult specimens somewhat more than 6-times, in younger individuals almost 7-times as long as wide, with the extremity of the lower margin rather sharp . . . . . *pareuchirus* Cout.

m_2 Merus of 3rd legs 5,4-times as long as wide, with the extremity of the lower margin rounded . . *pareuchirus* Cout. var. *Leucothea* de Man

l_2 Smaller chela of the male at least 5-times as long as high, carpocerite just as long as the antennular peduncle. Merus of 3rd legs 7,5-times as long as wide.

m_1 Frontal margin distinctly emarginate near the base of the rostrum; 2nd antennular article a little longer than the visible part of the 1st; larger chela distinctly emarginate on the lower margin. . . *leptochirus* Cout.

(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 914, Pl. LXXXVII, fig. 54).

m_2 Frontal margin straight near the base of the rostrum; 2nd antennular article a little shorter than the visible part of the 1st; larger chela with the lower margin only slightly sinuous . . . . . *leptochiroides* de Man

1) It remains uncertain whether the japanese *A. lobidens* de Haan is identical with *A. crassimanus* or not. I was unable to examine the single type specimen of *A. lobidens*, that is still preserved in the Leyden Museum, but that, as Dr. HORST informs me, is broken and fragmentary. I was, however, enabled to study two specimens of the species referred by Dr. ORTMANN to *A. lobidens* (in: Zool. Jahrb. V. Syst. 1890, p. 474, Tab. 36, fig. 13); unfortunately these specimens which I received from the Museum at Strassburg, were desiccated and in a bad state. They bore a close resemblance to *A. crassimanus*, especially the legs of the 1st pair, but those of the 2nd were somewhat different. The merus of the 2nd legs proved to be 8,5-times longer than wide and the carpal segments were 1,8 mm.; 1,8 mm.; 0,52 mm.; 0,48 mm. and 0,7 mm. long, the 1st segment 5,6-times longer than thick at distal extremity. These legs appeared therefore a little more slender than those of *A. crassimanus* and the 2nd segment was just as long as the 1st. The question whether both species are different or not, must be left to further researches.

c_2 Dactyli of three posterior legs with a small, acute, accessory tooth on the posterior margin . . . . . *Polyxo* de Man

b_2 Both in the male and in the female the dactylus of the small chela subspatulate in form, "Balaeniceps"-shaped.

c_1 Larger chela about 2,2-times as long as high, fingers almost as high as the palm.

d_1 Merus of 3rd legs 3,7-times longer than wide . . . . . *strenuus* Dana

d_2 Merus of 3rd legs almost 5-times as long as wide. *strenuus* Dana var. *angulatus* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 914).

c_2 Larger chela 2,4-times as long as high, fingers distinctly less high than the palm. Merus of 3rd legs 5-times as long as wide . . *Audouini* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 914).

c_3 Larger chela 2,86—3-times as long as high. Merus of 3rd legs 5,26—6,5-times as long as wide. . . . . *pareuchirus* Cout. var. *imitatrix* de Man

b_3 Dactylus of smaller chela neither in the male nor in the female subspatulate in form, never "Balaeniceps"-shaped.

c_1 Rostrum triangular, flattened above, very narrow. Proportion between length and height of the small chela in the male 4,85. . . . *bis-incisus* de Haan var. *stylirostris* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 911, Fig. 49, 49*a*).

c_2 Rostrum not flattened above.

d_1 Groove or depression on the supero-internal surface of the larger chela not triangular.

e_1 Groove or depression on the supero-internal surface of the larger chela U-shaped, the margins perpendicular to the upper margin of the palm. Rostrum joining the frontal margin by a regular curve . . . . . *Bouvieri* A. M.-Edw. var. *Hululensis* Cout.
(H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 908, Pl. LXXXV, fig. 46).

e_2 Groove or depression on the supero-internal surface of the larger chela almost inconspicuous. Frontal margin presenting a small prominence at either side of the rostrum . . . . . *Maindroni* Cout.
(H. COUTIÈRE, in: Bull. Soc. Entom. France, 1898, N° 5, p. 133, Fig. 2).

d_2 Groove or depression on the supero-internal surface of the larger chela triangular.

e_1 Merus of both chelipeds with the infero-internal margin unarmed. Spine of basicerite as long as stylocerite. Carpocerite much longer than antennular peduncle. Lateral margins of the rostrum setose . . . . . *pacificus* Dana

e_2 Merus of larger cheliped with a spine at the apex of infero-internal margin.

f_1 Fingers of the small chela as long as or somewhat longer than the palm. Dactylus of the large chela half as long as the palm . . . . . *Haanii* Ortm. [1])

(W. DE HAAN, Fauna Jap. Crust. 1849, p. 180, Pl. XLV, fig. 5 *(A. minor)*; A. ORTMANN, in: Zoolog. Jahrb. V, Syst. 1890, p. 472; J. G. DE MAN, ibidem, IX, Syst. 1897, p. 751).

f_2 Fingers of the small chela of the male almost twice as long as the palm. Dactylus of larger chela not shorter than the palm. Carpocerite as long as antennular peduncle. Terminal spine of scaphocerite not reaching beyond the tip of the rather broad scale. . . . . *macrodactylus* Ortm.

(A. ORTMANN, in: Zool. Jahrb. V, Syst. 1890, p. 473, Pl. XXXVI, fig. 10, 10*l*; J. G. DE MAN, in: Mém. Soc. Zool. France, 1898, p. 321, Pl. IV, fig. 4).

f_3 Fingers of the small chela at least 3-times as long as the palm. Carpocerite slightly longer than the antennular peduncle.

g_1 Fingers of smaller chela parallel, not gaping . . . . *malabaricus* Fabr.

(Vide: J. R. HENDERSON, in: Trans. Linn. Soc. London. Ser. 2, Vol. V, 1893, Pl. XL, fig. 1—3).

g_2 Fingers of smaller chela gaping.

h_1 Merus and propodus of 3rd legs 6- resp. 7-times as long as wide. Terminal spine of scaphocerite distinctly reaching beyond the tip of the scale . . . . . *malabaricus* Fabr. var. *dolichodactylus* Ortm.

(A. ORTMANN, in: Zool. Jahrb. V, Syst. 1890, p. 473, Pl. XXXVI, fig. 11).

h_2 Merus and propodus of 3rd legs 7—8- resp. 10-11-times as long as wide. Terminal spine of scaphocerite not or hardly extending beyond the rounded tip of the rather broad scale . . . . . *malabaricus* Fabr. var. *leptopus* de Man

a_2 Merus of 3rd legs with an acute tooth at the apex of posterior margin.

b_1 Inferior spine of basicerite reaching about to the middle of 2nd joint of antennular peduncle. First carpal article of 2nd legs almost twice as long as 2nd. . . . . *parvi-rostris* Dana [2])

b_2 Inferior spine of basicerite rudimentary or wanting.

c_1 Dactyli of three posterior legs biunguiculate.

First carpal article of 2nd legs equal to 2nd. Merus of 3rd legs less than 3-times as long as wide . . . . . *hoplites* Nob.

(G. NOBILI, Ricerche sui Crostacei della Polinesia, 1907, p. 357, Tav. I, fig. 7).

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1) *A. Haanii* is included in the section b_3 on the authority of Dr. ORTMANN, who did not observe the "Balaeniceps"-form of the dactylus of the smaller chela in the six specimens at his disposal. DE HAAN's original description of *A. minor* has perhaps been made after a single female.

2) It is to *A. parvi-rostris* that most closely approaches the egg-bearing female from Station 33, but it differs by the merus of 3rd legs being unarmed. It is not included in the key, because the larger cheliped and the 2nd legs are wanting.

c_2 Dactyli of three posterior legs simple.

d_1 First carpal article of 2nd legs almost twice or somewhat more than twice as long as 2nd.

e_1 Second article of antennular peduncle distinctly longer than the visible part of 1st.

f_1 Dactylus of smaller chela of the male hairy at the inner side, but presenting no hairy crest. Merus of 3rd legs 3-times as long as wide in the middle. Fingers of the chelae of 2nd legs longer than the palm . . . . . *Hippothoë* de Man

f_2 Dactyli of smaller chela of the male with a hairy crest at the inner side. Merus of 3rd legs 4—4,5-times as long as wide in the middle . . . . . *euchirus* Dana

e_2 Second article of antennular peduncle a little shorter than the visible part of 1st. Larger chela with the notches rather small and short . . . . . *euchiroides* Nob.

(G. NOBILI, Ricerche sui Crostacei della Polinesia, 1907, p. 356, Pl. I, fig. 6).

d_2 First carpal article of 2nd legs as long or a little shorter than 2nd.

e_1 Merus of 3rd legs 2,7-times as long as wide in the middle. Merus of both chelipeds unarmed at the apex of infero-internal margin. Dactylus of the small chela of the male sharply carinate above, very hairy at the inner side, but with no hairy crest . . . . . *funafutensis* Borr.

e_2 Merus of 3rd legs 4-times as long as wide. Merus of larger cheliped with a spine at the apex of infero-internal margin. Dactylus of the small chela of the male with a hairy crest on the inner side . . . . . *edamensis* de Man

e_3 Merus of 3rd legs 6-times as long as wide. Larger chela about 3-times longer than high, this chela as also the smaller chela and the 2nd legs nearly as in *A. pareuchirus* Cout. . . *Perezi* Cout.

(H. COUTIÈRE, in: Bull. Soc. Philom. Paris, 1908, p. 22).

I. *Megacheles* group.

† 1. *Alpheus Hailstonei* Cout. var. *assimulans* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 99.

Stat. 260. December 16 and 18. 5° 36′.5 S., 132° 55′.2 E. 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 2 males and 1 egg-bearing female.

Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 young specimen.

Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 adult, egg-bearing female and 12 younger specimens.

These specimens show some slight differences from the typical form of *A. Hailstonei*

and are therefore described as a variety, but the examination of a larger number of specimens belonging to the typical form will perhaps once prove that the differences are only individual. The largest specimens are a male from Stat. 260 and the egg-bearing female from Stat. 305, which are respectively 17 and 19 mm. long. In the adult male the rostrum reaches almost to the extremity, in the adult females just to the extremity of 1st antennular article and the orbital spines are slightly directed outward; the frontal margin between the rostrum and the orbital spines runs obliquely, different from the typical species (H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXIV, Fig. 18). The 2nd antennular article is slightly longer than in the typical form, namely one and a half as long as the visible part of the 1st and 2,5-times as long as the 3rd, the stylocerite reaches to the extremity of 1st article and the carpocerite is just as long as the antennular peduncle; the scaphocerite is also as long as the latter or hardly exceeds beyond it. The infero-lateral spinule on the basicerite reaches to the distal third of the visible part of 1st antennular article.

No spinules were observed on the upper margin of the merus of the larger cheliped, but the inner margin of the ischium bears 2 and that of the merus 4—6 small movable spinules. In adult specimens the larger chela is higher (or broader) than in the typical species: in the adult male from Stat. 260 this chela is 7,75 mm. long and 3 mm. broad, the proportion being 2,58; in the ova-bearing female from the same station the proportion is 2,76, but in a younger specimen from Stat. 431 2,94. In the typical species, however, the proportion between length and width of the larger chela is 3,33. One observes at the far end of the lower border of the palm, near the base of the immobile finger, three or four small obtuse tubercles, more obvious in the male than in the female.

The smaller cheliped resembles that of the typical species, but the fingers are, in adult specimens, not shorter, but very slightly longer than the palm which is also a little higher.

Carpus of 2nd legs as in the typical species, the 4th joint being not shorter than the 2nd; usually the 2nd, the 4th and the 5th joint are of equal length, rarely the 2nd appears shorter than the 4th. In the adult male from Stat. 260 the carpal joints are 2,12 mm., 1,04 mm., 0,6 mm., 1,02 mm. and 0,9 mm. long; the chela is 1,3 mm. long (palm 0,5 mm., fingers 0,8 mm.); in the adult, ova-bearing female from the same station these joints are 2 mm., 0,75 mm., 0,56 mm., 0,9 mm. and 0,84 mm. long, the chela is 1,36 mm. long (palm 0,6 mm., fingers 0,76 mm.). For the third younger specimen these numbers are 1,75 mm., 0,82 mm., 0,52 mm., 0,85 mm. and 0,8 mm., the chela is 1,1 mm. long (palm 0,46 mm., fingers 0,64 mm.) and for a young specimen, 10,5 mm. long, from Stat. 305 they are 1,3 mm., 0,56 mm., 0,4 mm., 0,6 mm. and 0,6 mm.; the chela is 0,88 mm. long (palm 0,36 mm., fingers 0,52 mm.).

In the adult male from Stat. 260 the propodus (2,8 mm.) of 3rd legs is but one-fourth longer than the carpus (2,2 mm.) and this is also nearly the case in the ova-bearing female, in which these joints are respectively 2,7 mm. and 2,1 mm. long; in younger specimens from Stat. 305 the propodus appears one-third longer than the preceding joint, rarely even almost one and a half as long. So in a specimen from this station the propodus is 2,14 mm. long, the carpus 1,6 mm., in another 2,2 mm. respectively 1,66 mm. and in a third the carpus is 1,12 mm. long, the propodus 1,6 mm. In the young individual from Stat. 282 the propodus

(1,85 mm.) is also one-third longer than the preceding joint (1,35 mm.). In adult specimens the posterior margin of the propodus which is 11-times as long as wide, bears 9 spines and 2 long setiform spinules occur at the far end of the anterior margin. The dactyli which measure almost one-third of the propodi, differ from those of the variety *laetabilis* by their posterior margin bearing no accessory claw, the margin being entire, but, like in that variety, one observes at the distal third of the anterior margin a spine or tooth pressed against it and at the base of which a few setae are inserted. This tooth, that is present on the dactyli of the three posterior legs, may easily be overlooked and occurs perhaps also in the typical form.

† 2. *Alpheus Hailstonei* Cout. var. *laetabilis* de Man.

J. G. de MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 98.

Stat. 49ª. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 2 young males.
Stat. 65ª. May 6. 7° 0′ S., 120° 34′.5 E. Near Saleyer. From 400 to 120 m. Pale, grey mud changing during haul into coral bottom. 1 young specimen.
Stat. 154. August 14. 0° 7′.2 N., 130° 25′.5 E. Bougainville Strait. 83—59 m. Grey muddy sand, shells and Lithothamnion. 12 specimens, 2 of which with eggs.
Stat. 240. November 22 till December 1. Banda-anchorage. From 9—36 m. Lithothamnion-bank in 18—36 m. 6 specimens, 2 of which with eggs.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 adult ova-bearing female and 4 young specimens.
Stat. 285. January 18. 8° 39′.1 S., 127° 4′.4 E. Anchorage South coast of Timor. 34 m. On the limit between mud and coral. Lithothamnion. 1 ova-bearing female.
Stat. 303. February 2/5. Haingsisi, Samau-island. Up to 36 m. Lithothamnion. 1 young specimen.
Stat. 310. February 12. 8° 30′ S., 119° 7′.5 E. Sapeh-Strait. 73 m. Sand with few pieces of dead coral. 2 adult females with eggs.

These specimens belong to the other one of the two varieties of *A. Hailstonei*, that seem to represent this species, proper to the Maldive and Laccadive Islands, in the Indian Archipelago.

The largest specimens, ova-bearing females, are 15 mm. long. The rostrum, reaching to the extremity or almost to the extremity of 1st antennular article, is separated anteriorly at either side by a shallow and narrow groove from the orbits, the orbital spines agree with those of the typical species. Antennular peduncle as in the latter, but the pointed stylocerite reaches to the apex of 1st joint; carpocerite often as long as the antennular peduncle.

Upper margin of the merus of the large cheliped with 4 or 5 movable spinules, one or two also on that of the ischium; inner margin of this joint with 3, that of the merus, which in the typical species is unarmed, with 8 or 9 similar, movable spinules. Larger chela in adult specimens a little broader (higher) than in the typical form, but for the rest resembling it; smaller cheliped also as in the typical form.

Fourth carpal segment of 2nd legs distinctly shorter than the 2nd and in a less degree also than the 5th, while, according to COUTIÈRE's figure (Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXIV, Fig. 18), the 2nd, the 4th and the 5th segment should be of equal length in the typical species: in the variety *laetabilis* the fingers are one and a half as long as the

palm. So e.g. in a large specimen from Stat. 154 the carpal segments are 1,8 mm., 0,88 mm., 0,52 mm., 0,7 mm. and 0,8 mm. long, the chela is 1,1 mm. long (palm 0,42 mm., fingers 0,68 mm.); in the adult, ova-bearing female from Stat. 282 these numbers are: 1,5 mm., 0,8 mm., 0,5 mm., 0,66 mm. and 0,75 mm., the chela is 1,04 mm. long (palm 0,4 mm., fingers 0,64 mm.); in another younger individual from the same locality the carpal segments are 1,1 mm., 0,58 mm., 0,36 mm., 0,48 mm. and 0,52 mm. long; the chela is 0,82 mm. long (palm 0,32 mm., fingers 0,5 mm.). In an adult, ova-bearing female, finally, from Stat. 310 the carpal segments are 1,7 mm., 0,9 mm., 0,5 mm., 0,7 mm. and 0,82 mm. long; the chela is 1,18 mm. long (palm 0,51 mm., fingers 0,67 mm.).

This variety is at once distinguished by the dactyli of the three posterior legs. In the typical form the propodi of the 3rd and 4th legs are said to be one and a half as long as the carpi. In this variety the specimens show a great variability, the propodi being $1^1/_3$—$1^1/_2$-times as long as the carpi. In the adult, ova-bearing female from Stat. 282 the carpus of 3rd legs is 1,4 mm. long, the propodus 2,1 mm.; in the ova-bearing female, long 12 mm., from Stat. 285 these numbers are 1,3 mm. and 1,9 mm.; in a specimen from Stat. 154 the carpus is 1,7 mm. long, the propodus 2,4 mm., not yet one and a half as long and in the adult, ova-bearing females from Stat. 310 the propodus (2,4 mm.) is but one-third longer than the carpus (1,8 mm.). In adult individuals the posterior margin of the propodus bears 8 spinules and one or two setiform spinules occur at the far end of the anterior margin. In COUTIÈRE's figure 18*c* the merus appears 11-times as long as wide; in an adult male from Stat 154 the merus of 3rd legs is 8-times as long (2,8 mm.) as broad (0,35 mm.) and in the adult, ova-bearing female from Stat. 282 6,6-times, this joint being 2,3 mm. long and 0,35 mm. broad. Nothing is said in COUTIÈRE's description about the dactyli, but in the figure 18*c* the dactylus appears simple. In this variety the dactylus, which is slightly longer than one-fourth of the propodus, is armed, at about one-fourth of its length from the tip, with a small, acute accessory claw on the posterior margin; the length of this claw measures one-sixth of the distance between it and the extremity of the dactylus. A little farther distant from the extremity the anterior margin presents also an acute tooth or spine, situated close to the margin and therefore rather indistinct, while, at its base, at each side two or three stout setae are inserted.

† 3. *Alpheus collumianus* Stimps.

W. STIMPSON, Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 30.
A. ORTMANN, Zool. Jahrb. V. Abth. f. Syst. 1890, p. 483, Taf. XXXVI, Fig. 15*k*, 15*m*.
H. COUTIÈRE, Alpheidæ Mald. and Laccad. Archip. 1905, p. 881.

Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, south of Saleyer. 8 to 10 m. Dead coral; Halimeda; Lithothamnion. 1 adult male, without the large cheliped.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 adult female with eggs.

Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. 12 m. Lithothamnion, sand and coral. 1 adult female with eggs and one young specimen.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion. 1 ova-bearing female and 3 young specimens.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. 31 m. Stone and some Lithothamnion. 1 young specimen.

Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 adult male without the 1st and 2nd pereiopods.

Stat. 209. September 23. Anchorage off the south point of Kabaëna-island. Reef. 1 much mutilated specimen.

Stat. 240. November 22 till December 1. Banda. From 9—36 m. Black sand, coral. Lithothamnion-bank in 18—36 m. 2 young specimens.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 adult male, 2 adult egg-bearing females and 5 younger specimens.

Stat. 299. January 27/29. 10° 52'.4 S., 123° 1'.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Depth up to 36 m. Mud, coral and Lithothamnion. 1 young specimen.

The adult male from Stat. 282 is 16 mm. long, the adult ova-bearing females 17 mm. In this male the rostrum hardly reaches beyond the middle of the visible part of 1st antennular article, the orbital spines that are barely shorter, are slightly curved inward. The 2nd antennular article (1,4 mm.), appears, as also in other specimens, a little more than twice as long as the visible part (0,62 mm.) of the 1st, which is as long as the 3rd. Spine on the basicerite reaching to the extremity of 1st antennular article; the scaphocerite, the outer margin of which is concave, is a little shorter than the carpocerite, which just reaches beyond the extremity of the antennular peduncle. Carpal segments of the larger (right) leg of the 2nd pair 1,6 mm., 1,2 mm., 0,5 mm., 0,6 mm. and 0,8 mm. long, chela 1,4 mm. long (palm 0,6 mm., fingers 0,8 mm.); in the left leg the 5th carpal segment appears not shorter than the 2nd.

Merus of 3rd legs 3,3 mm. long, 1 mm. wide in the middle, 3,3-times as long as wide; posterior margin with 6 movable spines (in the females with 5, in younger specimens with 4 or 3) and with a much larger, subapical, acute tooth, anterior margin with a long seta at the distal third and with a few setae at the far end. Anterior margin of the carpus setose, terminating in an acute tooth; posterior margin with 2 small, movable spinules in the middle (in the female often with one, or with two inserted abreast, in young specimens also with one) and with 4 similar spinules at the distal extremity, the two inner spinules somewhat larger than the outer. Propodus 2,16 mm. long, about two-thirds of the merus, 4-times as long as broad in the middle; posterior margin with 6 pairs of spinules, anterior setose. Accessory claw of dactylus shorter than the principal one.

In the adult female from Stat. 93 the 2nd antennular article (1,3 mm.) appears almost twice as long as the visible part (0,7 mm.) of the 1st; carpocerite distinctly longer than the antennular peduncle, which obviously reaches beyond the tip of the scaphocerite. In an adult female from Stat. 282 the scaphocerite reaches to the end of the carpocerite, which is hardly longer than the antennular peduncle.

In the adult female from Stat. 78, like in other specimens, the 2nd antennular article appears one and a half as long as the visible part of the 1st, just as is indicated for this species by Stimpson and Ortmann. The scaphocerite appears as long as the antennular peduncle and hardly shorter than the carpocerite. The rostrum, reaching to the middle of 1st article, is longer than the orbital spines.

In a young specimen, finally, long 11,5 mm., from Stat. 282 the rostrum reaches almost to the end of the 1st antennular article and appears distinctly longer than the orbital spines, which, like in other specimens, are directed straightly forward. The visible part (0,48 mm.) of 1st article is but little more than half as long as the 2nd (0,84 mm.). As regards the legs of the 1st pair, I must remark that the inner margin of the merus of both legs, in the male and in the female, bears 5—7 small, movable spinules and that it terminates in a small, acute tooth; the inner margin is also setose. The slightly setose, inner surface of the larger chela is marked with small, violet spots at the insertion of the hairs.

As is proved by the preceding description this species is somewhat variable as regards the length of the rostrum, the direction of the orbital spines, the length of the articles of the antennular peduncle and that of the scaphocerite.

Remarks. *A. deuteropus* Hilgd. and *A. paradentipes* Cout. are the most closely related species. I have never seen specimens of *A. deuteropus*, but the dactyli of the three posterior legs are simple, not biunguiculate, the inner margin of the merus of the chelipeds bears no tooth and the fingers of the smaller chela are much shorter than the palm. The chela which was described by HILGENDORF, seems to be the smaller, while the larger was figured by COUTIÈRE (Les "Alpheidae", 1899, p. 215, Fig. 254, 255).

General distribution: Japan, Kagoshima (ORTMANN); Bonin Islands (STIMPSON); Funafuti (BORRADAILE); New Caledonia (COUTIÈRE); Murray Island, Torres Strait (COUTIÈRE); Tague Island (COUTIÈRE); Maldive and Laccadive Archipelago (ORTMANN, COUTIÈRE); Djibouti (COUTIÈRE).

4. *Alpheus paradentipes* Cout.

H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 880, Pl. LXXIV, fig. 17.

Stat. 279. January 11/13. Rumah-Kuda-bay, Roma-island. 36 m. Mud and sand. 1 young specimen.

In this specimen, which is 9 mm. long, the rostrum reaches to the middle of the visible part of 1st antennular article and is slightly shorter than the orbital spines, which are directed straightly forward. The visible part (0,42 mm.) of 1st article is but little shorter than the 2nd (0,5 mm.) and the 3rd article is hardly as long as the visible part of the 1st. Stylocerite pointed, reaching almost to the end of 1st article. Scaphocerite extending almost to the end of 3rd antennular article, the blade which is fringed with feathered hairs, reaches to the end of the 2nd joint, while the carpocerite appears also a little shorter than the peduncle of the upper antennae; spine on the basicerite small, much shorter than the orbital spines. Inner margin of the merus of the larger (left) cheliped with 6, that of the smaller with 4 small, movable spinules and terminating in an acute tooth in both legs. Larger chela 3-times as long as high, smooth and glabrous on both sides.

Carpal segments of the left leg of the 2nd pair 0,7 mm., 0,47 mm., 0,28 mm., 0,26 mm., and 0,4 mm. long, chela 0,78 mm. long (palm 0,36 mm., fingers 0,42 mm.). Ischium of 3rd and 4th legs with a strong, movable spine. Merus of 3rd legs 1,8 mm. long, 0,29 mm. wide in the

middle, slender, 6,2-times as long as wide; excepting the strong tooth at the far end of the posterior margin the merus is unarmed; on both margins a few short setae are inserted, at the distal end of the anterior margin, however, one observes a long seta, half as long as the joint. Carpus also slender, 1 mm. long and nearly 5-times as long as broad; posterior margin with 4 spines. On the carpus of the right leg the 4 spines are equidistant and the 4th is hardly farther distant from the 3rd as from the distal extremity, but on the carpus of the left the 4th spine is placed just near the distal extremity, almost as in COUTIÈRE's figure 17*d*. There is a long seta at the distal third of the anterior margin and this seta is as long as that at the far end of the merus. The slender propodus, that measures a little more than two-thirds of the merus, is 1,32 mm. long, 0,2 mm. wide, thus 6,6-times as long as wide; its posterior margin bears 9 pairs of spinules, each pair consisting of a longer and a shorter spinule, there is also a setiform spinule at the far end of the anterior margin which is furnished with a few setae. The dactylus, 0,45 mm. long, measures one-third of the propodus; accessory claw little shorter than the principal.

General distribution: Laccadive Archipelago (COUTIÈRE).

II. *Macrochirus* group.

5. *Alpheus acuto-femoratus* Dana.

J. D. DANA, U. S. Exploring Exp. Crust., 1852, p. 550, Pl. 35, Fig. 2.
J. G. DE MAN, Abhandl. Senckenb. Naturf. Ges. XXV, 1902, p. 886, Pl. XXVII, Fig. 63.
Syn.: *Alpheus parabrevipes* Coutière, Bull. Soc. Entom. France, 1898, N° 6, p. 151.
Nec: *Alpheus acuto-femoratus* Spence Bate, Report Challenger Macrura, 1888, p. 545, Pl. 97, Fig. 2.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 3 specimens, 2 of which are adult and with eggs.
Stat. 149. August 10/11. Fau-anchorage and lagune, West coast of Gebé-island. Reef. 1 egg-bearing female.

These specimens fully agree with my detailed description of 1902.
A. parabrevipes Cout. from Samoa is apparently identical with this species.
General distribution: Balabac Strait (DANA); Ternate (DE MAN); Samoa (COUTIÈRE).

† 6. *Alpheus gracilis* Heller, var.

C. HELLER, in: Sitzungsber. Kais. Akad. Wiss. Wien. XLIV, 1861, p. 271, Taf. III, Fig. 19, 20.
J. G. DE MAN, in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 733, Taf. 34, Fig. 60*g*, 60*h*.

Stat. 225. November 8. 5700 m. N. 279° E. from South point of South-Lucipara-island. Reef. 1 adult specimen, probably a female.

A reexamination of HELLER's type specimen of *A. gracilis* from the Red Sea, kindly entrusted to me by Prof. VON MARENZELLER of the K. K. Naturhistorisches Hofmuseum at Vienna, enabled me to make the following observations on this specimen and on that from the reef near South-Lucipara-island.

The specimen from this island must probably be considered as a variety of *A. gracilis*,

but, as only one specimen was collected, later researches must decide whether the differences are only individual or whether it belongs to a valid local variety: in the latter case the name of *luciparensis* is proposed for it. The specimen from Lucipara-island is 15,5 mm. long. Rostrum acute, narrow, twice as long as broad at its base and projecting horizontally forward to the end of 1st antennular article; rostral carina not compressed laterally, slightly subacute above, reaching to the end of the orbital hoods from which it is separated by narrow, rather deep grooves. Orbital spines, at the antero-external angles of the orbits, reaching to the middle of the rostrum, projecting also horizontally forward, but distinctly inward, frontal margin at either side of the rostrum slightly arcuate and running obliquely backward from the base of the orbital spines to that of the rostrum. Corneae conspicuously faceted, a little less broad than the interspace between them. In HELLER's type from the Red Sea the rostrum is shorter, reaching only to the middle of the visible part of 1st antennular article, but for the rest the orbital region is the same.

Telson 2,9-times as long (1,9 mm.) as its posterior margin is broad (0,66 mm.), greatest width 1,9-times as wide (1,25 mm.) as the posterior margin; the latter slightly arcuate, postero-lateral angles not prominent; the longer spines on these angles are broken off, the outer are 0,16 mm. long. Upper surface of the telson rounded, lateral margins slightly arcuate; spinules of the upper surface large, 0,2 mm. long, inserted twice as far from the median line as from the lateral margins, anterior pair in front of the middle, 1,5-times as far distant from the posterior margin as from the base, posterior pair a little farther distant from the posterior margin than from the anterior pair. In HELLER's type specimen the telson is 3-times as long (2,26 mm.) as its posterior margin is broad (0,75 mm.), the greatest width (1,36 mm.) 1,8-times the breadth of the posterior margin; as in the specimen from Lucipara-island the posterior margin does not show a dentiform prominence and HELLER's description: "der Hinterrand in der Mitte zahnartig vorspringend", proves therefore to be wrong; the longer, slightly curved, slender, internal spines are 0,44 mm. long. The spinules of the upper surface are 0,26 mm. long, the anterior pair inserted not so far forward, only 1,35-times as far distant from the posterior margin as from the base. In HELLER's specimen the movable spine at the postero-lateral angle of the outer caudal swimmerets has a brown colour, in the specimen from Lucipara-island the spine of the left exopod is black, while the other is missing. According to HELLER the 2nd antennular article should be one and a half as long as the 1st and the 3rd that are almost equal: this now proved to be quite erroneous. In HELLER's type specimen, indeed, the 2nd article, almost one and a half as long as thick, appears even a little shorter than the visible part of the 1st, when the 1st is measured just near the base of the rostrum, and a little longer than the 3rd joint; the slender spine in which terminates the stylocerite reaches to the 2nd third part of 2nd antennular article.

In the specimen from Lucipara-island the 2nd joint appears a little thicker, only one-fourth longer than thick and it is not shorter, but as long as the visible part of the 1st, measured near the base of the rostrum; the 3rd article is as long as the 2nd and the spiniform stylocerite reaches to the middle of 2nd article.

Basicerite armed, on the lower side though just near the outer angle, with a well-developed,

triangular spine that reaches almost as far forward as the rostrum. Carpocerite extending beyond the antennular peduncle about by half the terminal joint; the terminal spine of the scaphocerite, the outer margin of which is nearly straight, reaches to the tip of the carpocerite, extends backward to the distal extremity of 2nd antennular article and overreaches with one-third or two-fifths of its length the narrow extremity of the blade, which is as long as the antennular peduncle.

As regards the outer antennae, the Red Sea type agrees with our specimen, but the carpocerite has a somewhat less stout shape.

Penultimate joint of external maxillipeds twice as long as thick at distal extremity, terminal joint 1,75-times as long as the penultimate, 4-times as long as broad at its base.

Merus of the large cheliped stout, 2,5-times as long as broad in the middle, distal extremity of the upper margin dentiform, obtuse; infero-internal margin with 4 small, movable spinules and at the distal extremity with a small, obtuse tooth. The larger chela closely resembles that of the Red Sea specimen, but the lower margin is more conspicuously notched at the base of the immobile finger and the extremity of the dactylus is not emarginate (DE MAN, l. c. Fig. 60*g*), but slightly arcuate.

The smaller cheliped is missing in both specimens; the 2nd legs of the typical species have been described in my paper of 1897, both are missing in the specimen from Lucipara-island.

In the typical specimen the merus of the 3rd legs is 4,28-times, in that from Lucipara-island, 4,68-times as long as wide in the middle, appearing in the latter a little more slender; carpus in the former 3,6-, in the latter 3,8-times as long as thick; propodus in the former 7,27-, in the latter 7,46-times as long as broad in the middle, armed in the former with 8, in the latter with 7 spines; propodus in the former 1,55-, in the latter 1,51-times as long as the carpus; dactylus in the former measuring just one-third of the propodus, in the Lucipara-specimen it is a little shorter, measuring $\frac{1}{3,3}$ of the propodus and the accessory claw or tooth, at one-fourth of its length from the tip, appears in the latter somewhat smaller than in the type.

The legs of the 4th pair that are missing in the Red Sea specimen, agree with those of the 3rd, the merus appears, however, 5,3-times as long as wide in the middle.

Remarks. *A. aglaopheniae* Borr. from the Engineer Group, British New Guinea (A. Willey's Zoolog. Results, Part IV, 1899, p. 417, Fig. 13*a*—13*f*), is apparently one of the most closely related species. It differs, however, by the orbital hoods being acute in front, but bearing no spines, by the shorter stylocerite, by the upper margin of the merus of the large cheliped terminating in a slender spine and probably by more other characters.

General distribution: Red Sea (HELLER); Mahé (COUTIÈRE).

7. *Alpheus ventrosus* H. M.-Edw.

H. MILNE-EDWARDS, Hist. Nat. Crust. II, 1837, p. 352.
H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 882.
Syn.: *Alpheus laevis* Randall, Journ. Acad. Nat. Sc. Philadelphia, 1839, p. 141; J. D. Dana, l. c. 1852, p. 556, Pl. 35, Fig. 8; C. Spence Bate, Report Challenger Macrura, 1888, p. 555, Pl. XCIX, Fig. 3; J. G. de Man, Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 861.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 10 specimens, 5 of which are egg-bearing.

Stat. 81. June 14. Pulu Sebangkatan, Borneo-bank. 34 m. Coral bottom and Lithothamnion. 1 young specimen.
Stat. 129. July 22/23. Anchorage off Kawio- and Kamboling-islands, Karkaralong-group. 23—31 m. Sand. 4 specimens, 2 of which with eggs.
Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar-)island. Reef. 10 specimens of medium size or young, 4 of which are egg-bearing.
Stat. 213. September 26—October 26. Saleyer-anchorage and surroundings, including Pulu Pasi Tanette, near the North-point of Saleyer-island. Up to 36 m. Mud and mud with sand. 1 egg-bearing female of medium size and 1 young specimen.
Stat. 240. November 22 till December 1. Banda-anchorage. Reef. 1 egg-bearing female of medium size and 1 young specimen.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 egg-bearing female.

This well-known species, easily recognizable by its stout and thick-set appearance, especially as regards the ova-bearing female, shows a rather great variability. While the egg-bearing female from Stat. 282 is only 23 mm. long, the largest egg-bearing females, captured at Stat. 78, measure 39 mm., being almost twice as large.

Of the small female from Stat. 282 the rostrum reaches to the end of 1st antennular article; the 2nd article is slightly shorter than the 1st, just as in some of the largest egg-bearing specimens from Stat. 78. In other specimens the 2nd article appears as long as the 1st or even longer and in a male from Ternate (Kükenthal Collection) of medium size the 2nd article is one and a half as long as the 1st. In other specimens the rostrum does not yet reach to the far end of 1st antennular article. Sometimes, as in adult females from Stat. 78, the antennal scale appears a little shorter than the antennal peduncle, in other specimens it is just as long.

The antero-lateral angle of the carapace is always distinctly angular, more or less obtuse, but is never so regularly rounded as in DANA's figure 8 *b*.

The larger cheliped occurs either at the right or at the left side. As was already pointed out by KOSSMANN (Zool. Ergebn. Reise in die Küstengebiete des Rothen Meeres, III, 1877, p. 81), the dactylus of the larger chela appears in some specimens rather obtuse, while it terminates in other individuals in a sharp point: perhaps the latter form of the finger may prove to be characteristic of the male.

Whereas the upper border of the carapace is usually straight, it appears in the larger females often more or less convex or gibbose.

Remark. According to Prof. COUTIÈRE (Les "Alpheidae" 1899, p. 18) *A. Rouxii* Guérin 1856 from Bombay should be identical with *A. ventrosus*.

General distribution. *A. ventrosus* is distributed from the Gulf of Akaba, through the Red Sea, the Indian Ocean, the Indian Archipelago and the Pacific, to Tahiti and the Hawaiian Islands; according to COUTIÈRE it occurs even in the Gulf of California.

†8. *Alpheus facetus* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 100.

Stat. 115. July 9/11. East side of Pajunga Island, Kwandang-bay. Reef. 1 young specimen.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 2 specimens, one of which is adult, the other very young.

This species is most closely related to *A. splendidus* Cout. from Djibouti (Bull. Muséum Paris, 1897, N° 6, p. 235), to *A. gracilis* Heller from the Red Sea, to its variety *Alluaudi* Cout. from Hulule Male Atoll and to *A. aglaopheniae* Borr. from New Guinea. Length of the adult specimen from Pulu Jedan 18 mm., carapace 6,4 mm. long, smooth and glabrous. The rostrum is acute, pointed, narrow, 3-times as long as broad at its base and reaches to the end of the first antennular article; whereas the lower margin of the rostrum is slightly ascending, the obtuse upper border is as slightly directed downward. Rostral carina not compressed, somewhat widening backward, obtuse and extending almost to the middle of the carapace (the rostrum included); in a lateral view the carina appears slightly directed downward, not fully concealed by the orbital hoods from which it is separated by moderately broad and moderately deep grooves. The orbits are armed anteriorly with an acute spine, which is slightly directed inward and much shorter than the rostrum, reaching to the 2nd third part of its length. In HELLER's type specimen of *A. gracilis*, that I had the opportunity to study (p. 337), the orbital spines reach about to the middle of the rostrum. At either side, between the rostrum and the orbital spines, the frontal margin shows, in *A. facetus*, an arcuate prominence; these prominences, however, hardly project beyond the orbital hoods.

Telson 2,3 mm. long, one and a half as long as broad, while the slightly arcuate, posterior margin measures one-third its length; upper surface smooth, glabrous, with a broad, shallow groove that runs from the base to the posterior margin and with 2 pairs of rather large spinules, the anterior pair situated nearly in the middle. In HELLER's type of *A. gracilis* the telson shows nearly the same characters, but the anterior pair of spinules are situated before the middle and the telson appears a little less broad (p. 338). Uropods much longer than the telson, endopod oval, movable spine, near the spiniform postero-lateral angle of the outer uropod, black; like in *A. gracilis*, of the two spines of the basal joint the inner is much smaller than the outer.

Second joint of antennular peduncle one and three-fourths as long as thick, a little shorter than the visible part of the first, measured from the base of the rostrum, third article one-sixth shorter than second; the stylocerite is slender and terminates in a spine that almost reaches to the middle of the second joint. In *A. gracilis* the antennular peduncle and the stylocerite almost resemble those of this species.

The spine of the basicerite reaches nearly as far as the first joint of the antennular peduncle and it is broad at its base; the carpocerite is robust and reaches beyond the tip of the antennular peduncle by half the length of the third article. The scaphocerite which is as long as the carpocerite and the outer margin of which is almost straight, is 2,5-times as long as broad and the terminal spine extends beyond the tip of the scale by one-third of its length, while the scale is just as long as the antennular peduncle.

Penultimate joint of external maxillipeds twice as long as thick, terminal joint twice as long as the penultimate and 5-times as long as broad, narrowing towards the distal extremity. Merus of the large cheliped half as wide at distal end as it is long; the upper margin terminates in an acuminate spine, which is curved inward, the infero-external margin is straight, entire, the infero-internal is armed with 2 or 3 small spinules while there is an acute tooth at

the distal extremity. Carpus unarmed. Chela one-third longer than the carapace, the rostrum included, somewhat turned outward, almost 3-times as long as high, decidedly compressed and a little more than half as thick as high; the chela is smooth and almost glabrous. The upper border of the palm shows a longitudinal groove, that runs from near the articulation of the dactylus, gradually narrowing, to that of the carpus; the outer margin of this groove, i. e. the upper margin of the outer face, is rather prominent, like the inner margin, which does not reach to the articulation of the dactylus, and the posterior, very narrow part of this groove runs along the elliptical area. Lower border of the chela rounded, fingers measuring two-fifths of the palm, dactylus obtuse, slightly longer than the immobile finger. In *A. gracilis* the upper margin of the merus of the large cheliped ends in an obtuse tooth and the chela is much higher, the palm indeed should be more than half as high as long (confer: J. G. DE MAN, in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 733, Taf. 34, Fig. 60*g*, 60*h*).

Merus of the small cheliped 3-times as long as broad at the distal end, armed with a curved spine at the far end of the upper margin, but the tooth at the distal extremity of the infero-internal margin is so small, that it may easily be overlooked. The chela is as long as the carapace and turned outward, about 5-times as long as high, slightly compressed; palm as long as the fingers, smooth, rounded, entire. Fingers tapering, shutting together, a little hairy, a few setae also on the distal half of the inner (upper) surface of the palm; a small acute tooth is observed at the inner (upper) side of the articulation of the dactylus.

Carpal segments of the (right) second leg 1,4 mm., 0,68 mm., 0,46 mm., 0,44 mm. and 0,8 mm. long; chela 1,54 mm. long (palm 0,75 mm., fingers 0,79 mm.). These numbers prove that the first segment is twice as long as the second and that the fifth is slightly longer than the second, whereas in *A. gracilis* it is shorter than it. The carpus also much resembles that of *A. aglaopheniae* Borr.

Ischium of 3rd and 4th legs with a movable spine. Merus of 3rd legs 5-times as long as wide, unarmed; carpus half as long as the merus; propodus 1,6-times as long as the carpus, 7—8-times as long as wide, posterior margin with 8 spinules. Dactylus hardly one-third of the propodus, 5-times as long as wide at its base in a lateral view, slightly curved, no accessory claw on its posterior margin, buth with a minute tooth at the distal third of the anterior; there are two setae at either side of this tooth, recognizable by means of the microscope. Anterior margin of carpus and propodus with a few setae. In *A. gracilis* the dactylus is biunguiculate, in its variety *Alluaudi* Cout. it is simple.

The two other specimens show some slight differences, all or partly due to their younger age. In the specimen, long 12 mm., from Pajunga Island the rostrum reaches to the 2nd third part, in the still younger individual from the Aru-islands, which is only 8 mm. long, even to the middle of the 2nd joint of the antennular peduncle and in both specimens this joint appears slightly, about one-sixth, longer than the visible part of the first, whereas the third joint is hardly shorter than the second. The movable spine of the outer uropod shows still a pale brown colour, appearing not yet black. The longitudinal groove on the upper border of the palm of the large chela is still little developed and not easily recognizable. The fingers

of the small chela are a little longer than the palm, more distinctly in the youngest specimen than in the other. The second legs are missing in both specimens, the following appear a little more slender than in the adult. So, for instance, the meri of the 3rd legs are 6-times as long as wide, the carpus, half as long as the merus, is 5-times as long as thick; the propodus, 1,55-times as long as the carpus, is 9-times as long as broad and bears in the specimen from Pajunga-Island seven, in the other six spinules; the dactylus, finally, measures one-third of the propodus.

Remarks. *A. aglaopheniae* Borr. differs 1° by the eye-hoods being acute in front, but not armed with a spine, 2° by the shorter stylocerite, 3° by the lower border of the large chela being notched, 4° by the dactyli of the three posterior legs being biunguiculate etc. *A. splendidus* Cout., of which by the courtesy of Professor COUTIÈRE I was enabled to examine the Djibouti type, differs at first sight by the orbital spines arising from the upper surface of the eye-hoods, at some distance from their arcuate, anterior margin, whereas one observes no prominence between the rostrum and the eye-hoods. The rostrum is obliquely directed upward, the stylocerite a little shorter and the groove on the upper border of the palm is much less conspicuous.

9. *Alpheus macrochirus* Richters.

F. RICHTERS, Decapoda der Insel Mauritius und der Seychellen, 1880, p. 164, Taf. XVII, Fig. 31—33.
A. ORTMANN, in: Zoolog. Jahrb. V, Abth. f. Syst. 1890, p. 485 and in: Jenaische Denkschriften, VIII, 1894, p. 15.
J. G. DE MAN, in: Abhandl. Senckenb. Naturf. Gesell. XXV, 1902, p. 863.
Nec: *Alpheus macrochirus* J. G. de Man, in: Archiv f. Naturgeschichte, 1888, p. 519.
Confer also: H. COUTIÈRE, Les "Alpheidae", Paris, 1899, p. 87, Fig. 51—53 and p. 218—221, Fig. 261.

Stat. 60. April 27/28. Haingsisi, Samau Island, Timor. Reef. 1 male.
Stat. 79b. June 12/13. Pulu Kabala-dua, Borneo-bank. Reef. 1 male.
Stat. 193. September 13/14. Sanana-bay, East coast of Sula Besi. Reef. 1 male.

The three specimens are all young, the largest, the male from Stat. 60, is 28 mm. long from tip of rostrum to the end of the telson; the two other males are much younger, *A. macrochirus* attains, however, a length of 45 mm. Both in the male from Haingsisi and in that from Stat. 79*b* the right cheliped is the larger, in the specimen from Stat. 193 both legs of the 1st pair are missing.

With regard to the chelipeds I wish to remark that the upper border of the palm of the smaller chela presents the same longitudinal groove as that of the larger. This groove, broadest distally and gradually narrowing towards the proximal extremity, is a little hairy and of the two ridges by which it is defined, the outer is entire but the inner is marked on its distal half with three or four small, obtuse lobes or teeth. One observes at the distal extremity of the inner ridge, i. e. at the base of the immobile finger, on the inner surface of the chela, a sharp blue-coloured tooth directed forward and the tips of the fingers which are a little longer than the palm, are also blue-coloured. On the larger chela not only the longitudinal groove

on the upper border, but also the two on the outer resp. the inner surface, that are directed from the articulation of the fingers almost to the middle of the palm, are quite conspicuous and the outer surface of the immobile finger is deeply concave. The inner margin of ischium and merus of the larger cheliped is finely denticulate.

Remarks. Of the other species of the *Macrochirus* group *A. socialis* HELLER from New South Wales is perhaps the most closely related. In this species, however, the lateral margins of the rostrum bear no hairs, the orbits present a small spine anteriorly and the basal spine of the outer antennae extends almost to the end of 2nd antennular article (though in Fig. 1 of Plate X of the "Novara-Reise" it appears much shorter, not longer than 1st article).

General distribution: Mauritius (RICHTERS); Dar-es-Salaam (ORTMANN); Madagascar (COUTIÈRE); Maledives (COUTIÈRE); Ternate (DE MAN); Tahiti (ORTMANN); Rotuma (BORRADAILE); Fernando-Veloso (COUTIÈRE); Congo (COUTIÈRE); Gulf of California (COUTIÈRE).

III. *Crinitus* group.

IIIa. *Obeso-manus* subgroup.

10. *Alpheus microstylus* (Sp. Bate).

Betaeus microstylus C. Spence Bate, Report Challenger Macrura, 1888, p. 566, Pl. CI, fig. 6.
Alpheus microstylus H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 884, Pl. LXXVI, Fig. 23.
Alpheus obesomanus J. G. de Man, in: Archiv f. Naturg. 53. Jahrg. 1888, p. 520 and in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 867—869.
Confer: H. COUTIÈRE, Les "Alpheidae", 1899, p. 223, Fig. 270—272.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 1 male and 1 egg-bearing female.
Stat. 144. August 7/9. Anchorage north of Salomakieë-(Damar)-island. Reef. 1 young male.

The male from Pulo Edam (Bay of Batavia), described by me (l. c.) in 1888 and in 1902 under the name of *A. obesomanus* Dana, is lying before me and proves to belong to *A. microstylus* (Sp. Bate).

The male and the female from Stat. 125 are respectively 18,5 mm. and 20 mm. long, this species attains, however, a length of 25 mm. In all the specimens the rostrum is developed. In the male from Stat. 125 the acute rostrum distinctly reaches beyond the orbital margins and measures about one-fourth the visible part of the 1st antennular article. The 2nd article, 0,9 mm. long and 0,33 mm. thick, appears slightly more than one and a half as long as the visible part (0,56 mm.) of the 1st and almost 3-times as long as thick; 3rd article two-thirds of the 2nd and a little longer than the 1st. Stylocerite acute, pointed, reaching to the distal 3rd part of 1st article. The scaphocerite which is cleft to the middle and the lamina of which is fringed with long, feathered hairs, appears just as long as the carpocerite but extends a little beyond the far end of the antennular peduncle; the scaphocerite is just 3-times as long as broad in the middle.

The larger chela closely resembles the accurate figures 270 and 271 in COUTIÈRE's work

of 1899, but the hairy groove on each side of the dactylus reaches but little beyond the middle; the smaller chela agrees also with the figure 272. This specimen bears only the right leg of the 2nd pair; the carpal segments measure 1 mm., 3,4 mm., 0,8 mm., 0,9 mm. and 1,3 mm.; the chela is 2,1 mm. long (fingers 0,94 mm., palm 1,16 mm.). Merus of 3rd legs 4 mm. long and 1,06 mm. wide in the middle; the carpus (2,8 mm.) is a little longer than the propodus (2,5 mm.), when measured between the two articulations, and the propodus bears 5 spinules, besides 4 on its outer surface. According to COUTIÈRE (l. c. 1905) the carpus should be slightly shorter than the following joint. Telson 2,7 mm. long, posterior margin 0,74 mm. wide, greatest width 1,66 mm.

In the egg-bearing female from Stat. 125 the rostrum (0,17 mm.) is almost half as long as the visible part (0,4 mm.) of 1st antennular article; the 2nd article (0,64 mm.), somewhat more than one and a half as long as the 1st, appears almost half as broad as long, this joint being 0,31 mm. thick in the middle. The two peduncles are of equal length, the scaphocerite a little longer.

The young male from Stat. 144 is 13 mm. long. Second antennular article 0,52 mm. long, half as thick as long, and little longer than the visible part (0,4 mm.) of the 1st. Rostrum one-fourth of the 1st article. In this male the grooves on the dactylus of the larger chela are as long as in COUTIÈRE's figure 271. The carpal segments of the left leg of the 2nd pair are 0,6 mm., 1,96 mm., 0,48 mm., 0,5 mm. and 0,84 mm. long, the chela is 1,43 mm. long (fingers 0,65 mm., palm 0,78 mm.). The carpal segments of the other leg are 0,52 mm., 1,4 mm., 0,4 mm., 0,4 mm. and 0,67 mm. long, the chela 1,2 mm. (fingers 0,54 mm., palm 0,66 mm.).

Remarks. *A. obeso-manus* Dana differs by the following. In this species the scaphocerite is considerably shorter than the antennular peduncle, hardly reaching beyond the 2nd article. The larger chela bears no furrows at all. The 2nd carpal segment of the 2nd legs is comparatively longer, 4-times as long as the 1st and longer than the three following segments and the chela taken together, while in *A. microstylus* it is shorter than the sum of these joints.

General distribution: Albany Island near Cape York (SPENCE BATE); Pulo Edam (DE MAN); Hulule Male Atoll (COUTIÈRE); Djibouti (COUTIÈRE); Mascate (COUTIÈRE).

† 11. *Alpheus microstylus* (Sp. Bate) var.?.

Stat. 40. April 2. Anchorage off Pulu Kawassang, Paternoster-islands. Coralreef. One male, probably young.

This specimen closely resembles *A. microstylus*, but differs from the specimens referred to this species by the more slender shape of the legs of the 2nd pair and by the telson tapering more backward. This specimen is 10 mm. long. Rostrum acute, measuring one-third the visible part of 1st antennular article. Second antennular article one and a half as long as the visible part of the 1st and 2,5-times as long as thick; 3rd article as long as 1st. Scaphocerite as long as the antennular peduncle, antennal peduncle reaching almost to the extremity of 3rd antennular article; the scaphocerite resembles that of *A. microstylus*, but its width is only one-fourth of its length.

Telson 1,7 mm. long, 0,85 mm. wide anteriorly, the posterior margin 0,28 mm. broad; the telson is 6-times as long as its posterior margin is wide and therefore narrows much more backward than the telson of *A. microstylus*. In the young male from Station 144 of the typical species the telson appears only 4-times as long (2 mm.) as its posterior margin is broad (0,5 mm.) and its greatest width is 1,16 mm. The larger cheliped closely resembles that of the typical species, the palm of the smaller chela is one and a half as long as the fingers.

Of the left leg of the 2nd pair, which is the longer, the carpal segments are 0,6 mm., 2,6 mm., 0,54 mm., 0,64 mm. and 0,84 mm. long; the chela is 1,22 mm. long (fingers 0,6 mm., palm 0,62 mm.). For the right leg these numbers are, in the same succession, 0,4 mm., 1,42 mm., 0,36 mm., 0,4 mm. and 0,54 mm.; the chela is 0,92 mm. long (fingers 0,42 mm., palm 0,5 mm.). The 2nd segment appears in the longer leg more than 4-times, in the other 3,5-times as long as the 1st, being therefore longer than in *A. microstylus*; the carpus and the whole leg appear, however, much more slender, the 2nd segment, indeed, of the left leg is, in the middle, 0,18 mm. thick, that of the right 0,16 mm., so that the 2nd segment of the left leg is 14-times, that of the right 9-times as long as thick.

In the young specimen, however, of *A. microstylus* from Stat. 144, which is 13 mm. long, the 2nd segment of the left carpus is 1,96 mm. long, but 0,255 mm. thick in the middle, being not yet 8-times as long as thick and presenting therefore a much stouter form than in the specimen from Stat. 40. It is provisionally regarded as a variety.

† 12. *Alpheus Lutini* Cout.

H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 885, Pl. LXXVI, Fig. 24.

Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 7 specimens, 4 of which are egg-bearing.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. Reef. One young male.

This species very closely resembles *A. microstylus* (Sp. Bate), with which it was collected at the same stations, but it is easily distinguished by the much shorter, rudimentary blade of the scaphocerite. The specimens are of a smaller size than those of *A. microstylus*, the largest, a female with eggs, being 18 mm. long. Unfortunately Dr. Coutière has not indicated the length.

In this largest specimen the 2nd antennular article is almost twice as long (0,64 mm.) as the visible part (0,34 mm.) of the 1st and 2,5-times as long as thick in the middle (0,255 mm.); in other specimens it appears a little shorter or almost 3-times as long as thick. Carpocerite reaching to the middle of 3rd antennular article, scaphocerite almost as long as the antennular peduncle. The scaphocerite, closely resembling Fig. 24 of Coutière's paper, appears 2,5-times as long as broad, but the terminal spine, 0,64 mm. long, appears as long as the blade, not shorter; in all the specimens the blade is fringed with very short hairs along its whole length. In all the specimens from Stat. 125 a minute rostrum is present, but it is wanting in the specimen from Stat. 144, the anterior margin of the carapace looks as in Fig. 6*c* of Plate CI of the Challenger Report. In this specimen the scaphocerite is not shorter than the antennular peduncle.

Telson of the largest specimen 2,45 mm. long, 1,3 mm. wide at base and 0,33 mm. at the posterior margin, the telson being more than 7-times as long as the posterior margin is wide, while the latter is one-fourth of the width at the base.

In an egg-bearing female, long 15 mm., the carpal segments of the left leg of the 2nd pair are 0,6 mm., 1,6 mm., 0,4 mm., 0,4 mm. and 0,6 mm. long; the chela is 1,2 mm. long (fingers 0,48 mm., palm 0,72 mm.). For the other leg these numbers are 0,7 mm., 2,24 mm., 0,5 mm., 0,55 mm. and 0,8 mm.; the chela is 1,5 mm. long (fingers 0,7 mm., palm 0,8 mm.). In larger specimens the 2nd segment appears comparatively a little longer.

General distribution: Hulule Male Atoll (Coutière); Samoa Islands (Coutière); Tague Island (Coutière).

† 13. *Alpheus malleodigitus* (Sp. Bate).

Betaeus malleodigitus C. Spence Bate, Report Challenger Macrura, 1888, p. 565, Pl. CI, Fig. 5.
Alpheus malleodigitus J. G. de Man, in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 866.
? *Alpheus phrygianus* H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 886, Pl. LXXVII, Fig. 25.
? *Alpheus persicus* G. Nobili, in: Bull. Scientif. France et Belgique, XL, 1906, p. 33.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 28 specimens of small size, mostly young, though 6 are provided with eggs.
Stat. 115. July 9/11. East side of Pajunga-island, Kwandang-bay. Reef-exploration. 1 adult male and 1 adult, ova-bearing female.
Stat. 142. August 5/7. Anchorage off Laiwui, coast of Obi Major. Reef. 1 adult, egg-bearing female.
Stat. 149. August 10/11. Fau-anchorage and lagune, West coast of Gebé-island. Reef. 1 young male.
Stat. 213. September 26—October 26. Saleyer-anchorage and Surroundings, including Pulu Pasi Tanette, near the North point of Saleyer-island. Reef. 6 adult specimens, 3 of which with eggs.

The largest ova-bearing females, those from Stat. 213, are 23 mm. long, the largest male specimens 17,5 mm. In all these specimens the interorbital carina, which is subacute and obliquely directed downward, ends in a very small, triangular rostrum, measuring about $^1/_4$ or $^1/_5$ the length of the visible part of 1st antennular article and hardly reaching beyond the orbital margins. The 2nd antennular article, in adult specimens from the stations 115 and 213, 3-times or almost 3-times as long as the visible part of the 1st, is slender, being in adult specimens 4,5—5-times as long as thick; the 3rd article, half as long as the 2nd, is obviously longer than the visible part of the 1st. Stylocerite obtusely pointed, a little shorter than 1st article. In adult specimens the carpocerite extends to the middle or almost to the middle of 3rd antennular article; in the younger specimens from Stat. 96 the carpocerite often reaches not farther than to the distal fourth part of 2nd article and such specimens bear a close resemblance to *A. Danae* Cout., a species which perhaps once will prove to be a variety of *A. malleodigitus*. The scaphocerite, the outer margin of which is concave, reaches, in adult individuals, to the distal third, fourth or fifth part of 2nd antennular article; the terminal spine is usually a little longer than one-third the total length of the scaphocerite, sometimes half as long and the outer margin

of the blade is fringed with feathered hairs, but in some specimens these hairs are partly or all worn off.

In the egg-bearing female from Stat. 142 the 2nd antennular article, 2,5-times as long as the visible part of the 1st, appears somewhat thicker than in the other specimens, namely only 3,6-times as long as thick; the carpocerite reaches just beyond the apex of 2nd antennular article and the scaphocerite, the terminal spine of which occupies half its length, extends almost to the extremity of that article. I believe it to be a local or individual variety. In adult specimens the palm of the small chela appears one and a half as long as the fingers or even a little more, in younger individuals the fingers are longer.

In an adult, ova-bearing female from Stat. 213 the carpal segments of the longer (left) leg of the 2nd pair are 2,8 mm., 4 mm., 1 mm., 1,4 mm. and 1,7 mm. long; the chela 2,9 mm. long (palm 1,7 mm., fingers 1,2 mm.). In the shorter (right) leg these measurements are: 1,45 mm., 2 mm., 0,6 mm., 0,7 mm. and 0,9 mm.; the chela is 1,9 mm. long (palm 1,05 mm., fingers 0,85 mm.). As regards their form, the carpal segments of the longer leg agree with BATE's figure 5 *l*, the 4th segment is, in the longer leg, 3,9-times, in the shorter 2,4-times as long as thick in the middle.

In the ova-bearing female from Stat. 115 the carpal segments of the longer leg are 2,1 mm., 3 mm., 0,75 mm., 1,2 mm. and 1,32 mm. long, the chela 2,3 mm. long (palm 1,3 mm., fingers 1 mm.); the carpal segments of the shorter leg are 1,4 mm., 1,65 mm.. 0,5 mm., 0,54 mm. and 0,8 mm. long; the chela is 1,63 mm. long (palm 1 mm., fingers 0,63 mm.). The 4th carpal segment is in the longer leg 3,4-times, in the other only 1,7-times as long as thick. These numbers show that the 2nd segment in the shorter leg has a somewhat variable length and that the form of these segments is also variable, the 4th being in the female from Stat. 213 2,4-times, in that from Stat. 115 1,7-times as long as thick. Merus of 3rd legs 3,8- to 4-times, in the specimen from Stat. 142 even 3,7-times as long as wide in the middle; carpus 4,8- to 5-times as long as thick in the middle, in the specimen from Stat. 142 4,4-times; propodus somewhat shorter than the carpus, the proportion being 1,25—1,26, in the specimen from Stat. 142 1,2-times. There are 5 or 6 spines on the lower margin of the propodus, the three distal ones each with a smaller spinule near them on the outer surface. Dactylus one-fourth the length of the propodus. Telson 4- to 5-times as long as its posterior margin is wide, the proportion between the width at base and that of the posterior margin somewhat variable.

Remarks. *Alpheus phrygianus* Cout. from the Maldive and Laccadive Archipelagoes is probably identical with this species, for *A. phrygianus* apparently only differs by its scaphocerite extending only to the middle instead of to the distal third part of 2nd antennular article.

As regards *A. persicus* Nob. I wish to remark that the proportion between the length of the two first carpal segments is 1,13, not 1,31 as indicated in NOBILI's paper, these joints being 1,5 and 1,7 mm. long (NOBILI, l. c. p. 34); this species apparently bears a close resemblance to the specimen from Stat. 142, for the 2nd antennular article is a little more than 3-times as long as thick and therefore this species also will perhaps once prove to be a variety of *A. malleodigitus*.

General distribution: Fiji Islands (SPENCE BATE); Ternate (DE MAN).

† 14. *Alpheus malleodigitus* (Sp. Bate) var. *gracilicarpus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 99.

Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, south of Saleyer. 8—10 m. Dead coral; Halimeda; Lithothamnion. 1 young female.

Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. 12 m. Lithothamnion-bottom, sand and coral. 1 young male, the larger chela of which encloses a Bopyrid.

Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 1 young male.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 3 specimens of medium size, one of which is ova-bearing.

In these specimens the carpal segments of the longer leg show a more slender form than in the typical species, the carpus of the 3rd legs appears also a little more slender and longer with regard to the propodus. Therefore these specimens are described as a variety.

The specimens from Stat. 282 are of medium size, about 15 mm. long. In the ova-bearing female the 2nd antennular article, 2,5-times as long as the visible part of the 1st, appears very slender, 5,5-times as long as thick in the middle, both extremities being somewhat swollen; 3rd article a little longer than the visible part of the 1st, half as long as the 2nd, just as in the typical form. Carpocerite reaching to the end of 2nd article, scaphocerite almost to the distal third part. The carpal joints of the longer (right) leg of the 2nd pair are 1,7 mm., 2,5 mm., 0,8 mm., 1,12 mm. and 1,3 mm. long; the chela 1,65 mm. long (palm 0,9 mm., fingers 0,75 mm.). Those of the other leg are 1,4 mm., 1,9 mm., 0,56 mm., 0,66 mm. and 0,9 mm. long, chela 1,5 mm. long (palm 0,9 mm., fingers 0,6 mm.). The 4th segment appears, in the right leg, 5,6-times, in the left 2,64-times as long as thick in the middle; in the young specimen from Stat. 99 the 4th segment of the longer leg is 5-times and in that from Stat. 93 5,5-times as long as thick, the 4th segment of the shorter leg in the former 2,2-times, in the latter 1,85-times as long as thick.

Merus of 3rd legs in the ova-bearing female from Stat. 282 4,3-times, in the young specimens from the stations 93 and 99 4,5-times as long as broad; the carpus appears in the female from Stat. 282 5,6-times, in the young specimen from Stat. 99 5-times and in that from Stat. 93 5,8-times as long as thick in the middle, presenting a more slender form than in the typical species; it appears also somewhat longer with regard to the propodus, the proportion being in these specimens 1,33—1,35, instead of 1,25 as in the typical species. In one of the specimens from Stat. 282 the carpocerite reaches only to the distal fourth part of 2nd antennular article.

† 15. *Alpheus* sp.

Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, south of Saleyer. 8 m. Dead coral; Halimeda; Lithothamnion. 1 female with eggs.

I do not succeed in identifying this specimen with any one of the known species, but I

don't like to describe it as a new form, because the legs of the 1st and the 2nd pair are wanting: it seems to belong to the *Obeso-manus* subgroup and appears related to *A. microstylus*, but it differs at first sight by the dactyli of the 3rd and 4th legs being provided with an accessory claw. When it once may prove to be a proper species, it will be one of small size, the specimen being only 11 mm. long.

Rostrum extremely short, broadly-triangular, obtuse, hardly projecting beyond the frontal margin that runs transversely as in *A. microstylus;* it is continued into a narrow, obtuse carina, which is separated by narrow, though quite distinct grooves from the rounded, unarmed orbits, to the base of which it reaches. Telson resembling that of *A. Lutini,* but somewhat less narrowed posteriorly, its length (1,75 mm.) being 4,375-times the width of the posterior margin (0,4 mm.); the greatest width anteriorly (1 mm.) is 2,5-times that of the posterior margin. Lateral margins straight, posterior margin rather prominent in the middle, the spinules of the inner pair almost as long (0,36 mm.) as the posterior margin is broad, those of the outer pair one-third of the latter; spinules of the upper surface small, 0,1 mm. long, inserted one and a half as far from the median line of the telson as from the lateral margins, distance between the anterior pair and the base two-fifths the length of the telson, posterior pair almost as far distant (0,5 mm.) from the anterior pair as from the posterior margin (0,54 mm.).

Second antennular article 2.5-times as long as thick, twice as long as the visible part of the 1st, 3rd article one-fifth longer than the visible part of the 1st; stylocerite acute, reaching to the middle of 1st article. Basicerite unarmed, carpocerite slender, reaching to the distal third of 3rd antennular article, terminal spine of the scaphocerite which is as long as the carpocerite and the outer margin of which is distinctly concave, extending backward to the distal fourth of 2nd antennular article and projecting with three-fourths of its length beyond the narrow tip of the blade, which, fringed with long hairs, hardly attains the end of the 2nd antennular article. Penultimate joint of external maxillipeds 3-times as long as thick, terminal joint $1^2/_8$-times as long as the penultimate, 5-times as long as broad at its base. Ischium-joints of 3rd and 4th legs with a small movable spine. Merus of 3rd legs 4-times as long (2,36 mm.) as broad in the middle (0,6 mm.), with a rather small, acute, apical tooth; carpus a little more than half as long as the preceding joint, 4-times as long (1,45 mm.) as thick (0,37 mm.), slender, with both the anterior and the posterior margin terminating in a short, acute tooth, for the rest unarmed; propodus 1,5 mm. long, 0,28 mm. broad at the proximal extremity and 0,21 mm. at the distal one, 6-times as long as wide in the middle, with 5 or 6 pairs of spinules on the posterior margin; the two spinules of each pair much differ in length, the longer almost as long as the propodus is broad. The propodus is only 1,03-times as long as the carpus, the anterior margin of both the propodus and the carpus setose, no spine at the distal extremity of the anterior margin of the propodus; dactylus styliform, one-third of the propodus, armed with a small, accessory claw, at one-fourth of its length from the tip.

Legs of 4th pair similar to those of the 3rd, the merus with a comparatively still smaller, apical tooth.

Ova few in number, probably large.

IIIb. *Crinitus* subgroup.

16. *Alpheus Alcyone* de Man (Charact. emend.).

Alpheus alcyone J. G. de Man, in: Abhandl. Senckenberg. Naturf. Gesell. Bd. XXV, 1902, p. 870, Taf. XXVII, fig. 61.
Alpheus alcyone G. Nobili, in: Bull. Scientif. France et Belgique, XL, 1906, p. 32.
Alpheus aculeipes H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 892, Pl. LXXIX, fig. 31.

Stat. 43. April 4/5. Anchorage off Pulu Sarassa, Postillon-islands. Depth up to 36 m. Coral. 1 young specimen.
Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion. 1 male.
Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 young male and 1 egg-bearing female of small size.
Stat. 285. January 18. 8° 39'.1 S., 127° 4'.4 E. Anchorage South coast of Timor. 34 m. On the limit between mud and coral. Lithothamnion. 1 young male and 1 egg-bearing female of small size.
Stat. 299. January 27/29. 10° 52'.4 S., 123° 1'.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. 34 m. Mud, coral and Lithothamnion. 1 young male and 2 egg-bearing females of small size.

One of the four type specimens from Ternate on which *A. Alcyone* was established in 1902, is lying before me. Its examination proved 1° that the ischium of the legs of the 3rd and 4th pairs is armed with a small movable spine and 2° that the dactyli of these legs are biunguiculate, presenting a small secondary claw at some distance from the tip. In both characters this species fully agrees with *A. aculeipes* Cout. from the Maldive and Laccadive Archipelagoes and in my opinion these two species are therefore identical. According to Professor Coutière's description the fingers of the larger chela should measure one-fourth of its length, but in his figure 31 they appear half as long as the palm, just as in *A. Alcyone*. One of the largest specimens is the male long 13 mm. from Stat. 99, according to Nobili, however, *A. Alcyone* attains a length of 26 mm. In this specimen the 2nd antennular article appears a little more than one and a half as long as the visible part of the 1st, the antennal peduncle reaches by the length of the 3rd article beyond the tip of the antennular peduncle, the scaphocerite, decidedly shorter than the carpocerite, appears as long as the antennular peduncle and the blade hardly reaches beyond the 2nd article of the latter. The stylocerite which is widened in its basal part, is but little shorter than the 1st article. Basicerite unarmed. Penultimate joint of the external maxillipeds one and a half times as long as broad; terminal joint twice as long as the penultimate, 1,2 mm. long and 0,36 mm. broad, almost 4-times as long as broad. Large chela 8 mm. long, fingers in proportion to the palm as 3 : 5; palm 3,2 mm. high. The carpal segments of the 2nd legs are 0,44 mm., 1,56 mm., 0,38 mm., 0,4 mm. and 0,56 mm. long; the 2nd segment is 3,5-times as long as the 1st, the 5th one-fourth longer than the 1st. Chela 1,06 mm. long, fingers one and a half as long as the palm.

In the legs of the 3rd and 4th pairs the ischium carries a small movable spine. Merus of 3rd legs 4-times as long as wide, posterior margin of the inner surface armed, along its

whole length, with eight spinules, of which the distal ones are the longest, measuring 0,14 mm., the proximal shorter, 0,09 mm. long. Posterior margin of the carpus ending in a spine and armed with two spinules, that are inserted somewhat nearer to the merus than to the propodus. Anterior margin of the propodus ending in a spine, posterior with 7 spinules. Dactylus with accessory claw as in *A. aculeipes*.

The egg-bearing female from Stat. 282 is 10 mm. long. The merus of the 3rd legs is 5-times as long as broad in the middle; the posterior margin of the inner surface carries 14 spinules that slightly increase in length from the proximal (0,05 mm.) to the distal ones (0,14 mm.). Posterior margin of the carpus with one spinule, situated somewhat nearer to the merus than to the propodus. Eggs few in number, globular, diameter 0,52 mm. broad. In the male, long 10,5 mm., from Stat. 285 the carpal joints of the 2nd legs are 0,44 mm., 1,38 mm., 0,34 mm., 0,36 mm. and 0,54 mm. long; chela 1 mm. long (palm 0,46 mm., fingers 0,54 mm.). Merus of 3rd legs with 9 spinules on the posterior margin of its inner surface, carpus with one spinule on the middle of the posterior border. In the egg-bearing female that has the same size, the merus of the 3rd legs is 1,92 mm. long and 0,42 mm. broad in the middle, almost 5-times as long as broad and the inner posterior margin is armed with 9 or 10 spinules; carpus with 2 spinules on the middle of posterior margin.

The younger female from Stat. 299 is 10,5 mm. long; the merus of the 3rd legs shows the same measurements as in the egg-bearing specimen from the preceding station, but the inner margin carries 14 spinules, that, like in the other specimens, increase in length from the proximal to the distal ones; there are also 2 spines on the middle of the posterior border of the carpus. The other egg-bearing specimen is 14 mm. long. The scaphocerite is a little longer than the carpocerite and the blade or lamina reaches almost to the end of the antennular peduncle. Carpus of 3rd legs with two spines on the middle of posterior margin, inner margin of the merus with 6 or 7 spinules.

A. aculeipes var. *tryphopus* Nob. from Marokau ought probably to be considered as a proper species (Bull. Muséum Paris, 1906, N°. 5, p. 257).

General distribution: Ternate (de Man); Arzana Island, Persian Gulf (Nobili); Maldive and Laccadive Archipelago (Coutière); Djibouti (Coutière); Fernando-Veloso (Coutière).

† 17. *Alpheus Arethusa* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 100.

Stat. 60. April 27/28. Haingsisi, Samau Island, Timor. Reef. 1 male and 1 ova-bearing female.

A new species of the *Crinitus* subgroup, closely related to *A. styliceps* Cout.

The two specimens are 10 mm. long. Frontal margin as in *A. styliceps*, but the rostrum much less prominent, smaller, hardly half as long as broad at its base and reaching only to the 2nd sixth of the visible part of 1st antennular article; at either side of the short rostrum the frontal margin runs obliquely backward, in a much less degree, however, than in *A. styliceps* and then passes with an obtuse angle to the rounded, unarmed walls of the orbital hoods,

which are laterally more prominent than in that species. The corneae are much farther distant from one another, the interspace being as broad as their diameter; the interorbital carina, at first very narrow and little prominent, becomes somewhat broader backward and can be followed, at least in the female, almost to the middle of the carapace. Before the orbits the upper surface of the front is flattened; shallow, though rather broad furrows separate the rostral carina from the orbital hoods.

In the male the pleura of the 1st—4th abdominal somites terminate in a spiniform process with a rather obtuse tip, that of the 1st somite being curved forward; the 5th and the 6th somites are also acute, while the pleura of the 2nd are not very broad. The outer angles of the posterior margin of the 6th somite terminate in a strong spiniform tooth; between these two the margin is produced into an acute median tooth, that is only half as long as the teeth at the outer angles. In the female the pleura of the 1st somite terminate in a short obtuse process at their posterior angle and those of the following in an obtuse point; posterior margin of the 6th somite like in the male. Telson of the male 3,5-times (in the female 3,7-times) as long as the posterior margin is broad, its greatest width, at one-third of its length from the base, almost twice as broad as the posterior margin, the proportion being as 11 : 6; spinules of the upper surface 0,16 mm. long, situated close to the lateral margins, the anterior pair just in front of the middle, the posterior pair not far from the anterior and twice as far from the posterior margin as from the anterior pair. Posterior margin rounded, little prominent; of the two spines at the outer angles the inner ones are half as long as the posterior margin is broad.

Second article of antennular peduncle twice as long as thick, one and a half as long as the visible part of the 1st; this visible part hardly longer than the 3rd article. Stylocerite acute, reaching to the distal third of the visible part of 1st article. Basicerite unarmed. Carpocerite extending beyond the tip of the antennular peduncle almost with the whole length of 3rd article. The scaphocerite, the outer margin of which is distinctly concave and the terminal spine of which extends backward to the middle, slightly projects beyond the tip of the antennular peduncle; the narrow blade, finally, devoid of hairs, reaches to the end of the 2nd article. Terminal joint of external maxillipeds 4-times as long as broad.

The larger chela of the male resembles that of *A. ovaliceps*. This chela, 5,5 mm. long, one and a half as long as the carapace, is almost 2,25-times as long as high, the palm being 2,4 mm. high; the palm is ovoid, almost as thick as high, everywhere rounded, presenting only a slight depression at the far end of the upper border. Immobile finger with the tip acute, slightly grooved on the outer side, convex on the inner; the dactylus, 2 mm. long, somewhat more than one-third the total length, is obtuse, much longer than the immobile finger and regularly curved above. Chela smooth and glabrous. Merus stout, one and a half as long as broad in the middle; upper margin unarmed, infero-internal margin with a subacute tooth at the extremity. Larger chela of the female one and a third times as long as the carapace, 2,6-times as long as high, outer face of the merus twice as long as broad. For the rest the chela and the merus agree with those of the male. The smaller chela of the male much resembles that of *A. styliceps*, but the fingers are a little shorter in regard to the palm,

the proportion between the length of the fingers and that of the palm being as 4 : 3; the palm, one and a half as long as high and as thick as high, is smooth and glabrous. The fingers, that are slightly curved inward like in *A. styliceps*, shut close together; the dactylus, looked at from above, appears a little narrowed near the base, the width being here one-sixth of its length. The merus, 1,8 mm. long, appears a little more than twice as long as broad, its greatest width being 0,8 mm.; there is a quite rudimentary tooth at the apex of the infero-internal margin. The smaller chela of the female has the same characteristic shape, the palm appears, however, a little less high, the proportion between length and height being as 5 : 3; the palm is also a little longer in regard to the fingers, the latter being in proportion to the palm as 14 : 11. The merus, 1,8 mm. long like in the male, is only 0,7 mm. broad.

Second legs of a stout shape, short, much resembling those of *A. styliceps*. Merus, in the male, 6-times as long as broad in the middle, carpal joints long: 0,5 mm., 0,8 mm., 0,2 mm., 0,2 mm. and 0,4 mm.; chela 0,8 mm. long (palm 0,3 mm., fingers 0,5 mm.). The second joint is 4-times as long as thick, the two following joints are even slightly thicker than long, viz. 0,21—0,22 mm. thick.

In the female the merus has the same form, the carpal joints are 0,52 mm., 0,7 mm., 0,22 mm., 0,22 mm. and 0,42 mm. long, chela 0,84 mm. long (palm 0,32 mm., fingers 0,52 mm.). The second joint is little more than 3-times as long as thick, the two following are as thick as long. The second joint appears, in the male, slightly more, in the female slightly less than one and a half as long as the first and the chela is as long as the three last joints taken together. Merus of 3rd legs in the male 3,9-times, in the female 4,1-times as long as broad in the middle, with a tolerably strong, acute tooth at the far end of the posterior margin; carpus stout, in the male 2,7-times, in the female 2,8-times as long as thick, almost half as long as the preceding joint, its posterior margin armed in the female with one, in the male with two small, movable spinules, long 0,11—0,13 mm., and terminating in an acute tooth, while the anterior margin bears 7 or 8 long setae. Propodus 4-times as long as broad, slightly narrowing distally, the posterior margin with 7 spines, proportion between the length of the carpus and that of the propodus in the male 1,42, in the female 1,43; anterior margin of the propodus setose. Dactylus one-fourth of the propodus, slightly curved, with a small, accessory claw on the posterior margin. Merus of 4th legs in the male 4,2-times, in the female 4-times as long as broad in the middle, unarmed; carpus with one spinule on the middle of the posterior margin. Third and fourth legs with the ischium unarmed. Eggs large, few in number.

† 18. *Alpheus paralcyone* Cout.

Alpheus paralcyone H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 895, Pl. LXXX and LXXXI, fig. 34.

Alpheus paralcyone J. Pearson, On the Macrura, in: Herdman's Report Pearl Oyster Fisheries, 1905, p. 85.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 22 m. and less. Mud, coral and coralsand. 1 very young specimen.

Stat. 43. April 4/5. Anchorage off Pulu Sarassa, Postillon-islands. Depth up to 36 m. Coral. 1 young male.

Stat. 49ª. April 14. 8° 23'.5 S., 119° 4'.6 E. Sapeh-Strait. 70 m. Coral and shells. 3 specimens, one of which is ova-bearing.

Stat. 50. April 16/18. Bay of Badjo, West coast of Flores. Depth up to 40 m. Mud, sand and shells, according to locality. 1 female without eggs.

Stat. 60. April 27/28. Haingsisi, Samau-island, Timor. 36 m. Lithothamnion in 3 m. and less. 1 female without eggs.

Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, south of Saleyer. 8 m. Dead coral; Halimeda; Lithothamnion. 1 young female.

Stat. 80. June 13. 2° 25' S., 117° 43' E. Borneo-bank. From 50 to 40 m. Fine coralsand. 1 young specimen.

Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion. 1 young specimen.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 36 m. Mud and hard sand. 3 young specimens, one of which with eggs.

Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. 45 m. Coral and Lithothamnion. 1 young male.

Stat. 164. August 20. 1° 42'.5 S., 130° 47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 2 males and 2 egg-bearing females.

Stat. 213. September 26—October 26. Saleyer-anchorage. 9—34 m. Mud and mud with sand. 1 very young specimen.

Stat. 240. November 22 till December 1. Banda-anchorage. Lithothamnion-bank in 18—36 m. 1 male and 1 small, egg-bearing female.

Stat. 250. December 6/7. Kur-island. 27 m. Coral and Lithothamnion. 1 young specimen.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 5 specimens of different size, one of which with eggs.

Stat. 303. February 2/5. Haingsisi, Samau-island. Depth up to 36 m. Lithothamnion. 1 very young specimen.

Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 egg-bearing female without the legs of the 1st pair.

This species differs from *A. Alcyone* de Man = *aculeipes* Cout. in the main by the following: 1° There is a distinct spine on the basicerite, though rather short (not long, as stands in COUTIÈRE's description), 2° the shape of the smaller chela, especially in the male, the dactylus being distinctly broadened and, like in the female, just as long as the palm, 3° by the first carpal segment of the 2nd legs being longer in proportion to the 2nd and hardly shorter than the 5th, 4° by the merus of the 3rd legs bearing no spinules on the inner posterior margin, 5° by the merus of the 4th legs presenting also a subapical tooth, though usually smaller than that of the 3rd and 6° by the 6th abdominal somite bearing a couple of small teeth in the middle of the posterior margin.

The specimen from Stat. 33 is one of the smallest of the 28 that were collected and 4 mm. long. The carpal segments of the second legs are 0,2 mm., 0,35 mm., 0,1 mm., 0,1 mm. and 0,22 mm. long; the chela is 0,54 mm. long (palm 0,24 mm., fingers 0,3 mm.), as long as the two first segments taken together. Carpus of the 3rd legs with two spines, that of the 4th with one on the posterior margin, besides the terminal spine.

In the largest specimen from Stat. 49ª, a male long 14,5 mm., the carpal segments are 0,65 mm., 1,6 mm., 0,36 mm., 0,4 mm. and 0,7 mm. long, the chela is 1,26 mm. long (palm 0,52 mm., fingers 0,74 mm.). Merus of third legs 3,2 mm. long and 0,86 mm. wide in the

middle, 4-times as long as wide; four spines on the posterior margin of the carpus. Subapical tooth of the merus of fourth legs much smaller than that of the third; carpus with 3 spines on the posterior border besides the terminal one.

In the specimen from Haingsisi, a female long 13 mm., the posterior margin of the 6th abdominal somite carries 3 acute teeth in the middle instead of 2 as usually.

In the young specimen from Stat. 80, in one from Stat. 133, in the specimens from Banda and in the two youngest from Stat. 282 the subapical tooth of the merus of fourth legs appears a little larger than usually and but little smaller than the tooth with which the merus of the third legs is armed; in these specimens the posterior margin of the 6th abdominal somite is entire, presenting no trace of the two or three teeth that ordinarily occur on it in the middle and in the young individual from Stat. 80 the scaphocerite appears a little longer than the antennal peduncle. In the young male from Stat. 144 the lower margin of the ischium of the smaller cheliped ends in a sharp tooth and this is also the case with the ischium of both chelipeds in a specimen from Stat. 164 and in this specimen one observes again three teeth on the middle of the posterior margin of the 6th somite instead of two. All these differences are regarded by me as individual varieties. Those specimens in which the tooth on the merus of 4th legs is larger than usually and in which the 6th somite bears no teeth in the middle of its posterior margin, approach to *A. bucephalus* Cout., but the broadened dactylus of the smaller chela in the male, the biunguiculate dactyli of the 3rd and 4th legs, the spine on the basicerite etc. are characters, by which *A. paralcyone* is easily distinguished.

In the very young specimen, long 4 mm., from Stat. 303 the telson is 0,74 mm. long, 0,36 mm. broad near the base and the posterior margin is 0,22 mm. broad; the telson appears therefore a little more slender than in adult specimens.

General distribution: Maldive and Laccadive Archipelagoes (Coutière); off Mutwal Island (Pearson).

19. *Alpheus paraculeipes* Cout.

Alpheus paraculeipes H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 894, Pl. LXXIX and LXXX, fig. 32.
Alpheus paraculeipes J. Pearson, On the Macrura, in: Herdman's Report Pearl Oyster Fisheries, 1905, p. 84.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 young specimen, 9 mm. long.

The scaphocerite hardly reaches to the middle of 3rd antennular article, while the rudimentary blade extends to the 2nd third part of median article.

Telson 1,44 mm. long, width near the base 0,82 mm., width of the posterior margin 0,64 mm.

The carpal segments of the second legs are 0,45 mm., 1,12 mm., 0,26 mm., 0,27 mm. and 0,4 mm. long; chela 0,86 mm. long (palm 0,34 mm., fingers 0,52 mm.). Proportion between the first and the second segment 2,5, in older specimens it becomes 3.

Merus of 3rd legs four times as long as broad in the middle (2,04 mm. long and 0,5 mm.

broad). The outer posterior margin is glabrous, but the inner is fringed with about 20 setiform spines which are shorter than usually: according to COUTIÈRE's description they should be 0,3 mm. long, while the longest in the specimen, collected by the "Siboga", near the subapical spine, measure 0,18 mm. The external posterior margin of the carpus, which is 0,86 mm. long from articulation to articulation, ends distally in a subacute tooth and it carries five long setae and just beyond the middle a very small spinule, that is 0,04 mm. long; the internal posterior margin is fringed with 10 or 11 setiform spinules, which are longer than those of the merus. Propodus one and a half as long as the carpus, with 7 spines on the posterior margin and a much smaller spine at the far end of the anterior border; the long setae of the posterior margin are not perpendicular to the joint, but are directed obliquely towards the dactylus, the accessory claw of which is small.

General distribution: Maldive Archipelago (COUTIÈRE); Cheval Paar, Ceylon (PEARSON).

20. *Alpheus crinitus* Dana.

Alpheus crinitus J. D. Dana, U. S. Explor. Exped. Crustacea. p. 548. Pl. 34. fig. 8.
Alpheus crinitus A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890. p. 479.

Thanks to the courtesy of Prof. DÖDERLEIN of Strassburg I was enabled to examine the specimen from Samoa, that was referred by Dr. ORTMANN to *A. crinitus* Dana: also in my opinion this specimen, which is a male, 23 mm. long and apparently adult, appertains to DANA's species. The rostrum is as long as the 1st antennular article, rostral carina compressed, obtuse, not extending beyond the base of the orbital hoods from which it is separated by deep grooves. Frontal margin slightly emarginate at either side of the rostrum. Second antennular article hardly twice as long as the visible part of the 1st, 3rd article hardly shorter than that visible part; stylocerite acuminate, a little longer than basal article. Lower spine of basicerite small. Carpocerite about as long as the antennular peduncle, not shorter; terminal spine of scaphocerite a little longer than the antennular peduncle, the lamina as long as that peduncle. According to DANA the terminal spine of the scaphocerite should be slightly shorter than the peduncles.

Telson 2,82-times as long as the posterior margin is broad, the latter with the outer angles not at all prominent, obtuse; inner spinules of the posterior margin short, hardly one-third the width of the margin, outer spinules half as long. Proportion between the width at base and that of the posterior margin 1,75. Spinules of the upper surface rather far distant from the lateral margins, situated almost midway between the latter and the mid-line of the telson; the spinules measure one-seventh the length of the telson, the anterior pair is situated before the middle, the proportion between the length of the telson and the distance of that pair from the posterior margin being 1,66 and the proportion between the distances of both pairs from the posterior margin amounts to 1,6. Merus of larger cheliped obtuse at the apex of the upper margin, infero-internal margin terminating in an obtuse tooth. The chela agrees with DANA's description and figures. Smaller cheliped missing.

The carpal segments of the 2nd legs are 1,9 mm., 2,14 mm., 0,84 mm., 0,9 mm. and

1,34 mm. long, the second segment only 1,1-times longer than the first; the chela, in which the fingers are hardly shorter than the palm, appears as long as the 4th and the 5th segments combined. DANA's description is not in accordance with his figure 8*e*: in this figure the sum of the 3rd, 4th and 5th segments appears, like in the specimen from Samoa, one and a half as long as the 2nd segment, while according to the description it should be just as long. The chela in the Samoa specimen is not shorter than the 4th and the 5th segments taken together.

Ischium of 3rd and 4th legs with a movable spine. Merus of 3rd legs 4-times as long as wide in the middle, apical tooth rather small; the posterior margin of the carpus ends in a spine, for the rest the carpus is unarmed; propodus with 6 sets of spinules, dactylus simple, almost half as long, viz. three-sevenths of the propodus.

General distribution: Balabac Straits (DANA); Samoa (ORTMANN); Japan, Kagoshima (ORTMANN).

†21. *Alpheus parvus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1909. p. 102.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 36 m. Mud and hard sand. 1 female with eggs.

A new species of small size, apparently belonging to the *Crinitus* subgroup and closely related to *A. crinitus* Dana and *A. clypeatus* Cout.

Rostrum acute, one and a half as long as broad at its base, projecting horizontally forward and reaching to the distal fourth of the visible part of 1st antennular article; the anterior part of the rostral carina, from the tip to the middle of the eyes, is strongly compressed, sharp, the posterior part that first somewhat broadens nearly to the base of the orbital hoods and, narrowing then again, is continued to the posterior third of the carapace, appears obtuse. The middle part of the interorbital carina is separated from the rounded, unarmed, orbital hoods by narrow, though rather deep grooves, that anteriorly become broader, while they slightly diverge posteriorly. Eyes large, broader than the interspace between them. Frontal margin transverse, only very slightly sinuate at either side of the rostrum.

Abdominal pleura broad, rounded or obtuse. Telson 4,54-times as long (1,68 mm.) as its posterior margin is broad (0,37 mm.), anteriorly twice as broad (0,8 mm.); posterior margin hardly prominent, inner spines at the outer angles 0,35 mm. long, almost as long as the posterior margin is broad, outer spines one-third of the inner. Spinules of the upper surface 0,15—0,16 mm. long, inserted not far from the lateral margins, the anterior pair immediately in front of the middle, the posterior pair one and a half as far distant from the posterior margin as from the anterior pair.

Second joint of antennular peduncle twice as long as thick, one-fourth longer than the visible part of the 1st, 3rd joint but a little shorter than the latter; terminal spine of stylocerite hardly reaching to the end of 1st joint. Basicerite with a small, inferior spine, 0,16 mm. long, not extending as far forward as the stylocerite. Carpocerite projecting, like in *A. clypeatus*, beyond the antennular peduncle almost by the whole length of 3rd article; terminal spine of

the scaphocerite, the outer margin of which is slightly concave, as in *A. clypeatus*, reaching to or perhaps even just beyond the end of the carpocerite, extending backward to the middle of the 2nd antennular article and projecting, like in *A. clypeatus*, by two-fifths of its length beyond the tip of the rather narrow blade, which is fringed with long hairs and just reaches to the end of the antennular peduncle.

Penultimate joint of external maxillipeds slender, 2,5-times as long as the distal extremity is thick, terminal joint one and a half as long as the penultimate, 5-times as long as broad or thick at its base, in a lateral view.

Larger cheliped missing. Merus of the smaller cheliped 3-times as long as broad, upper margin unarmed, infero-internal margin with a strong, slender spine near the distal extremity, the length of this spine is one-third the greatest width of this joint. Chela 2,1 mm. long, half as long as the carapace (4,3 mm.), fingers very little shorter than the palm, proportion between the length of the fingers and that of the palm as 10 : 11; chela almost 4-times as long as the palm is high (0,55 mm.).

Merus of 2nd legs 8-times as long as broad. Carpal segments 0,64 mm., 0,82 mm., 0,3 mm., 0,3 mm. and 0,43 mm. long, chela 0,83 mm. long (palm 0,38 mm., fingers 0,45 mm.); the 2nd segment, 5-times as long as thick, is 1,28-times as long as the 1st, the 1st one and a half as long as the 5th, the 3rd and the 4th equal, half as long as the 1st and almost twice as long as thick, the chela, finally, is as long as the 2nd segment and a little longer than the 4th and the 5th together. Ischium of 3rd and 4th legs with a strong movable spine. Merus of 3rd legs 4,5-times as long as broad in the middle, glabrous, armed with a strong, acute, apical tooth like in *A. bucephalus*, carpus half as long as the preceding joint, 3,3-times as long as thick in the middle, its posterior margin terminating in a strong, acute tooth, for the rest unarmed. Propodus 1,24 mm. long, one-fourth longer than the carpus, 5-times as long as broad, its posterior margin with 6 strong spines; there is also a spiniform seta at the end of the anterior margin, on which one observes also some other setae, like on the anterior margin of the carpus; dactylus simple, two-fifths of the propodus and just half as long as the carpus. Merus of the 4th legs 4,8-times as long (1,72 mm.) as broad in the middle (0,36 mm.), armed with an equally strong, apical tooth as the merus of the 3rd legs; carpus half as long as the merus, 3,6-times as long as thick, for the rest similar to that of the 3rd legs; propodus 1,3-times as long (1,12 mm.) as the carpus (0,86 mm.), 5-times as long as broad, with 7 strong spines on the posterior margin and a shorter one at the distal end of the anterior, which, like the anterior border of the carpus, bears a few long setae of different length; dactylus, like that of the preceding legs, two-fifths of the propodus, simple.

Eggs few in number, ovoid, one and a half as long as broad, large, 0,76—0,78 mm. long.

Length from tip of rostrum to end of telson 11,5 mm.

Remarks. *A. crinitus* Dana differs by its much larger size, by the different shape of the telson and the different arrangement of the spinules on its upper surface and on its posterior margin. The rostrum is longer, not continued backward beyond the orbital hoods, the 2nd antennular article is also longer. There are, finally, also differences in regard to the legs.

†22. *Alpheus consobrinus* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum. Vol. XXX. 1908. p. 101.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 male.
Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion. 2 specimens of small size, one of which with eggs.
Stat. 115. July 9/11. East side of Pajunga-island, Kwandang-bay. Reef. 1 female with eggs.
Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 1 ova-bearing female.
Stat. 213. September 26—October 26. Saleyer-anchorage and Surroundings, including Pulu Pasi Tanette, near the North point of Saleyer-island. Reef. 1 young specimen.
Stat. 299. January 27/29. 10° 52′.4 S., 123° 1′.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Dived to a depth of 36 m. Mud, coral and Lithothamnion. 1 specimen without eggs and without the legs of first pair, probably belonging to this species.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 2 ova-bearing females, one of which is adult, and 1 young specimen.

Closely related to *A. bucephalus* Cout. and *A. clypeatus* Cout.

The male from Stat. 78 is 14,5 mm. long. Rostrum acute, reaching almost to the middle of the visible part of 1st antennular article; rostral carina sharp, becomes flattened behind the eyes passing into the surface of the carapace. Frontal margin as in *A. bucephalus*. Second joint of antennular peduncle one and a half as long as the visible part of the 1st, 3rd joint a little shorter than 1st; stylocerite pointed, broadened at its base and reaching to the distal third of 1st joint. Carpocerite extending by half the length of the 3rd joint beyond the end of the antennular peduncle. The basicerite appears unarmed, but in this specimen like in most others it seems to be broken off, for in the three specimens from Stat. 315 it bears a very small infero-lateral spinule. Scaphocerite resembling that of *A. bucephalus*, but just reaching beyond the tip of the carpocerite, the blade fringed with hairs and as long as the antennular peduncle.

In the adult female from Stat. 315 which is 15,5 mm. long, the narrow rostrum extends to just beyond the middle of 1st article, the 2nd article is but one-third longer than the visible part of the 1st and the carpocerite extends almost by the whole 3rd article beyond the end of the antennular peduncle; the acute stylocerite reaches almost to the end of 1st article. The ova-bearing female from Stat. 115, 14 mm. long, agrees with the preceding one, but the 2nd antennular article is but little longer than the 1st and the carpocerite extends by half the length of 3rd article beyond the tip of the antennular peduncle.

In the younger ova-bearing female from Stat. 315, only 8,5 mm. long, finally, the rostrum reaches to the distal third of the visible part of 1st antennular article, the 2nd article is hardly longer than the 1st, which is as long as the 3rd; the stylocerite reaches to the end of basal article.

It remained doubtful whether the specimen from Stat. 299 belongs also to this species, because the scaphocerite appears a little shorter than the carpocerite, exactly as in *A. bucephalus* and because the two legs of the 1st pair are missing.

Telson both in the male and in the female slightly narrower than that of *A. bucephalus*, its length being in proportion to the width of the posterior margin as 9 : $3^1/_3$, in *A. bucephalus* as 9 : 4. In the adult male from Stat. 78 the telson is 2,7 mm. long, 1,44 mm.

broad anteriorly, its posterior margin 1 mm. broad and in the adult female from Stat. 315 these numbers are 2,28 mm., 1,32 mm. and 0,84 mm.; in the small egg-bearing female from the same station, long 8,5 mm., the telson is still narrower posteriorly, being 1,22 mm. long, 0,68 mm. broad anteriorly and 0,36 mm. at the posterior margin. Endopod of caudal fan armed on its outer and posterior margin with about 30 spinules, those on the outer margin being larger. Posterior margin of the telson with 20 feathered setae between the outer angles.

Penultimate joint of external maxillipeds one and a half as long as thick; terminal joint twice as long as the penultimate and about 3-times as long as broad.

Chelae of both legs of 1st pair turned outward, the dactylus being situated on the outer side and even a little obliquely directed downward. Merus of the large cheliped of the adult male one and a half as long as broad; the slightly arcuate, upper margin ends in a subacute tooth, while the inner margin bears an acute tooth near the far end, which tooth is wanting in *A. bucephalus*; in both chelipeds the ischium ends in a large prominence, which in a lateral aspect appears acute. Chela resembling that of *A. bucephalus*, the fingers measuring also one-third of its length, but, measured in the plane of the fingers, the palm appears a little less high than in COUTIÈRE's figure 29*a*, the length of the palm being in proportion to its height as 5 : 3; dactylus obtuse, immobile finger pointed. Inner (upper) face of the immobile finger and the contiguous part of the palm hairy, in a less degree also the outer (lower) side of the immobile finger. The prominence at the lower margin of the ischium of the large cheliped is more acute in the female than in the male; the merus is nearly twice as long as broad and the subapical tooth on the inner margin resembles that of the male. Chela considerably smaller than in the male, little more than half as long; its form is also different, for it seems to narrow more considerably towards the fingers, when looked at in the plane of the latter, so that the lower margin of the chela appears more strongly arcuate. Palm and immobile finger are nearly glabrous, except on its cutting-edge.

The merus of the smaller cheliped of the male from Stat. 78 is a little broader than that of *A. clypeatus*, its outer face one and a half as long (2,6 mm.) as broad (1,6 mm.). The somewhat arcuate upper margin ends in a subacute angle, when the outer face is looked at; the inner margin is unarmed. Carpus short as in *A. clypeatus*, nearly as long as the anterior margin of its upper surface is broad; a small tooth near the middle of this margin. The chela which is 4,5 mm. long and much resembles that of *A. clypeatus*, is but little more than half as long as the large chela; measured in the plane of the fingers, i. e. on the inner (upper) surface, the chela appears 3-times as long as broad (high). Fingers slightly longer than the palm; dactylus situated on the outer side and much broadened, being half as broad as long; the upper (outer) face, which is slightly convex both longitudinally and transversely, narrows from the middle of the finger to the pointed tip, that is slightly curved inward. Along the edge that makes the inner (upper) face of the dactylus with the upper (outer) one, the finger is thickly fringed with long hairs from the base to near the tip; the somewhat flattened, inner (upper) face of the palm and of the immobile finger, which is straight and a little broader, at the inner (upper) side, than the dactylus, is also covered with long hairs.

Unfortunately only one adult female carries the small cheliped, namely that from Stat. 315.

Merus unarmed, little more than twice as long as broad, with the upper margin strongly arcuate. Carpus longer than in the male, almost twice as long as broad near the articulation with the chela. Chela resembling that of the female of *A. bucephalus*; viewed at from the upper side, the chela appears 3,5-times as long as broad near the carpal articulation; it regularly narrows towards the extremity of the fingers that are narrow, conical and little shorter than the palm, the palm being in proportion to the fingers as 13 : 10. Carpus of second legs similar to that of *A. bucephalus*. In the adult male from Stat. 78 the carpal segments of the right leg are 0,7 mm., 1,9 mm., 0,44 mm., 0,48 mm. and 0,8 mm. long, the 2nd segment, 0,25 mm. thick, is about 8-times as long as thick; chela 1,16 mm. long (palm 0,56 mm., fingers 0,6 mm.). In the left leg the carpal segments are 0,64 mm., 1,7 mm., 0,42 mm., 0,46 mm. and 0,72 mm. long; the chela is 1,12 mm. long (palm 0,56 mm., fingers 0,56 mm.). The carpal segments of the right leg of the adult female from Stat. 315 are 0,6 mm., 1,44 mm., 0,36 mm., 0,32 mm. and 0,56 mm. long; the chela is 1,05 mm. long (palm 0,5 mm., fingers 0,55 mm.); in the left leg these numbers are: 0,57 mm., 1,3 mm., 0,34 mm., 0,32 mm. and 0,54 mm.; the chela is 1,04 mm. long (palm 0,48 mm., fingers 0,56 mm.). In the adult male the second segment appears almost 3-times, in the adult female somewhat more than twice as long as the first and the fifth segment appears in the male slightly longer than the first, in the female both are equal.

Ischium of 3rd and 4th legs armed with a strong movable spine. Merus of 3rd legs 4-times as long as broad in the middle, armed with a strong, acute, subapical tooth; upper margin straight, with very short setae along its whole length and with 2 or 3 longer ones at the distal end, lower margin with 3 or 4 short setae. Carpus half as long as the merus, lower margin straight, terminating in a strong tooth at the distal end, without spinules and glabrous; upper margin with long setae that are arranged in tufts of two or three. Propodus one-fifth longer than the carpus, with 6 pairs of movable spines along its posterior border, close to each of which two setae are inserted; upper margin with long setae and with a slender, though feeble spine at the distal end. Dactylus slender, slightly curved, measuring one-third of the propodus and without accessory claw. Merus of 4th legs with a subapical tooth which is comparatively as large as that of the 3rd.

Whereas the male of *A. consobrinus* differs at first sight from that of *A. bucephalus* by the small cheliped, the female can be distinguished by the scaphocerite being longer than the carpocerite, by the spine on the basicerite, by the merus of the larger cheliped presenting a tooth on its inner margin and by the shape of the telson.

23. *Alpheus spongiarum* Cout.

Alpheus spongiarum H. Coutière, in: Bull. Muséum Paris. 1897. N° 6. p. 236 and 1900. N° 8. p. 413.
Alpheus spongiarum H. Coutière, Les "Alpheidae", Morphologie externe et interne, formes larvaires, Bionomie. Paris 1899. p. 147. fig. 141.
Alpheus spongiarum J. Pearson. Ceylon Pearl Oyster Report. Macrura. 1905. p. 85.

Stat. 115. July 9/11. East-side of Pajunga-island. Kwandang-bay. Reef. 1 male.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 36 m. Mud and hard sand. 1 male.

Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 female with eggs.

Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 male.

The specimen from Kwandang-bay is 12 mm. long. Scaphocerite as long as antennular peduncle, blade reaching to the distal third of 2nd article; carpocerite longer than scaphocerite. The carpal segments of the 2nd legs measure: 0,56 mm., 1,4 mm., 0,3 mm., 0,32 mm. and 0,56 mm.; chela 1,18 mm. long (palm 0,5 mm., fingers 0,68 mm.); proportion between first and second segment 2,5. Merus of 3rd legs 2,6 mm. long and 0,58 mm. broad in the middle, proportion 4,5; the outer posterior margin carries two long setae in the middle and one near the tooth, the others are perhaps worn off; about 20 very short setae along the inner margin. Carpus ending in a subacute tooth at the distal extremity of its posterior border, the latter bears no spinule, but 5 or 6 long setae; anterior border with many setae of unequal length, two of which on the distal half are nearly as long as the carpus. Posterior border of propodus with 8 spines, but there is also a small spine at the far end of the anterior border, which, according to COUTIÈRE, does not exist in this species; posterior border also with many long setae, like the anterior. Dactylus with a trace of an accessory claw.

The young specimen from Stat. 133 is 9 mm. long. Scaphocerite reaching to the middle of 3rd antennular article, blade hardly reaching beyond 1st article. Proportion between the length (2 mm.) of the merus of 3rd legs and its width (0,43 mm.) in the middle 4,65; external posterior margin with 10 long setae that are about one and a half as long as the merus is broad, internal margin with about 20 much shorter setae, only 0,18 mm. long and less. External posterior border of the carpus with a small acute tooth at the far end, without a spinule in the middle, but fringed along its whole length with 10 long setae; anterior border on the distal third with 2 long setae that are as long as the carpus and with smaller setae behind them. Propodus but one-fourth longer than the carpus, posterior margin with 7 spines, no spine at the end of the anterior; near each of the 7 spines a seta is inserted, but for the rest the posterior border bears no setae, whereas the anterior is fringed with long ones. Accessory claw of dactylus not recognizable.

The eggs of the female from Stat. 273 which is 13 mm. long, are few in number, globular, with a diameter of 0,8 mm. The carpocerite extends beyond the antennular peduncle only by one-fourth of 3rd article, scaphocerite hardly reaching to the end of the antennular peduncle, blade reaching to the distal fourth of 2nd article. The carpal segments of the 2nd legs are 0,5 mm., 1,06 mm., 0,28 mm., 0,3 mm. and 0,5 mm. long; chela 1,1 mm. long (palm 0,4 mm., fingers 0,7 mm.); second segment only twice as long as first. Merus of 3rd legs 2,2 mm. long, 0,54 mm. broad in the middle, only four times as long as broad; external posterior margin with 12 long setae, internal with about 25, that are short, measuring 0,16 mm. and less. Outer posterior margin of the carpus with 10 long setae, without a spinule but ending in an acute tooth, inner with 8 or 9 much shorter setae; anterior margin with 9 or 10 setae, of which one near the distal extremity is the longest, being almost as long as the carpus. Propodus one-third longer than the carpus, with no spine at the far end of the anterior border; posterior

border with 8 spines and with a long seta inserted near each of them; anterior border with long setae. Accessory claw small, but distinct.

The male, finally, from Stat. 305 is 11,5 mm. long. Scaphocerite hardly shorter than the antennular peduncle, blade reaching to the middle of 2nd article. Carpocerite extending beyond the tip of the antennular peduncle by the length of 3rd article. Merus of 3rd legs 2,24 mm. long, 0,52 mm. broad in the middle, only 4,3-times as long as broad; external posterior margin fringed with 10 long setae, setae of the internal margin short. Posterior border of the carpus terminating in an acute tooth, without a spinule on the middle, but fringed with 11 long setae. Propodus with 7 spines on the posterior border, without a spine at the far end of the anterior, that is fringed with long setae, while near each of the 7 spines of the posterior a seta is inserted. There is a slight trace of an accessory claw on the dactylus.

These specimens, though few in number, are very interesting, for they render it probable that *A. spongiarum* and *A. paraculeipes* are varieties of one and the same species. According to COUTIÈRE (Alpheidae Mald. and Laccad. Archip. 1905, p. 894) the merus of 3rd legs should be 5-times as long as broad in *A. spongiarum*, but 3,88-times in *A. paraculeipes*: in the four specimens, which were referred to *A. spongiarum* because the external posterior margin of the merus is fringed with long setae, the proportion between length and width proved to be 4,5; 4,65; 4 and 4,3. This proportion appears therefore to vary considerably, in no one the merus appears so slender as should be characteristic of this species and in the ova-bearing female it has the same stout form as in *A. paraculeipes*. Also in regard to other characters one observes some variability, so e. g. in the specimen from Stat. 115 the propodus of the 3rd legs carries a spine at the far end of the anterior border, and an accessory claw on the dactylus is usually more or less distinct.

General distribution: Djibouti (COUTIÈRE); Cheval Paar, Ceylon (PEARSON); Torres Strait (COUTIÈRE).

† 24. *Alpheus Eulimene* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI. 1909. p. 101.

Stat. 154. August 14. 0° 7'.2 N., 130° 25'.5 E. Off North coast of Waigeu Island. 83 m. Grey muddy sand, shells and Lithothamnion. 1 specimen.

A new species of the *Crinitus* subgroup, closely related to *A. styliceps* Cout. and to *A. Arethusa* de Man.

Rostrum very small, subacute, reaching only to the 2nd fifth of the visible part of 1st antennular article, twice as broad at its base as it is long; at either side of the rostrum the frontal margin runs transversely outward and, nearly as in *A. superciliaris* Cout., is separated by a distinct emargination from the rounded, orbital hoods. Rostral carina rather sharp and narrow between the orbits, from which it is separated by narrow and shallow grooves; posterior to the corneae the rostral carina becomes somewhat broader and is prolonged to just behind the middle of the carapace.

The posterior margin of the pleura of the 1st abdominal somite terminates in a spiniform,

though obtuse process, that is curved forward; pleura of the following somites rounded. Posterior margin of 6th somite with a large, acute tooth at the outer angles, but, differently from *A. Arethusa*, unarmed in the middle. Telson long 1,25 mm., 3,5-times as long as the posterior margin is broad, greatest width almost twice as broad as the posterior margin, the proportion being as 17 : 9. Posterior margin not at all prominent, internal spines near the outer angles one-third the width of the margin, external spines half as long as the internal; spinules of the upper surface 0,15 mm. long, anterior pair twice as far distant from the posterior margin as from the anterior, posterior pair almost one and a half as far distant from the posterior margin as from the anterior pair.

Second joint of antennular peduncle almost twice as long as thick, almost one and a half as long as the visible part of the 1st article, which visible part appears a little longer than the 3rd; stylocerite acute, reaching to the distal third or fourth of the visible part of 1st article.

Basicerite umarmed. Carpocerite slender, projecting beyond the tip of the antennular peduncle almost by the length of the terminal article; the scaphocerite, the outer margin of which is slightly concave, reaches to midway the tips of both peduncles, the blade, however, is still shorter than in *A. styliceps*, for it only extends to the 2nd third part of 2nd antennular article.

Penultimate joint of external maxillipeds one and a half as long as broad, in a lateral view, terminal joint twice as long as the penultimate and four times as long as broad.

Merus of the large cheliped stout, twice as long as broad in the middle, upper margin unarmed, infero-internal margin with a rather strong, acute tooth at the far end. Large chela resembling that of *A. Arethusa*, a little more than one and a half as long (5,25 mm.) as the carapace (3,2 mm.), rostrum included, ovoid, almost 2,5-times as long as high (2,2 mm.) and almost as thick (1,9 mm.) as high; length of the fingers, i. e. the length of the dactylus (1,55 mm.), not yet one-third the total length. Palm smooth, glabrous, outer face of the immobile finger slightly concave, inner face convex, fingers as in *A. Arethusa.*

Merus of the small cheliped 2,6-times as long as wide, presenting its greatest width at the anterior third, infero-internal margin with a rudimentary tooth at the far end. The chela, closely resembling that of *A. styliceps*, is 2,3 mm. long, hardly three-fourths the length of the carapace; the length of the palm, which is one and a half as long as high and slightly thicker than high, is in proportion to the length of the fingers as 10 : 13. Palm smooth and glabrous, fingers shutting close together, distinctly curved inward.

Merus of second legs 7-times as long as broad. Carpal segments 0,5 mm., 0,72 mm., 0,2 mm., 0,2 mm. and 0,36 mm. long, chela 0,74 mm. long (palm 0,3 mm., fingers 0,44 mm.); 2nd segment 4-times as long as broad, 3rd and 4th segments almost quadrate, their length being in proportion to the width as 10 : 9. The 2nd segment appears, like in *A. Arethusa*, one and a half as long as the 1st.

Third legs resembling those of *A. Arethusa*, but there are no spinules on the posterior margin of the carpus and the dactylus is simple, without an accessory claw. Merus 4,1-times as long as broad in the middle, armed with a strong apical tooth, carpus almost half as long as the merus, 2,8-times as long as thick, propodus 4,4-times as long as broad, narrowing distally,

its posterior margin with 7 spines, the propodus 1,4-times as long as the carpus, dactylus one-fourth of the propodus.

Merus of fourth legs unarmed, as in *A. Arethusa*, 4,4-times as long as broad in the middle, carpus 2,8-times as long as thick, unarmed, almost half as long as the merus, propodus just one and a half as long as the carpus, with 6 spines on the posterior margin, dactylus one-fourth the length of the propodus, simple.

The only collected specimen, probably a young female, is 8 mm. long.

† 25. *Alpheus pachychirus* Stimps.

Alpheus pachychirus W. Stimpson, Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 30.
Alpheus pachychirus J. G. de Man, in: Notes from the Leyden Museum, XII, 1890, p. 116, Pl. 6, fig. 14 and in: Abhandl. Senckenb. Naturf. Gesell. XXV, 1902, p. 875.
Alpheus pachychirus A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 489, Taf. XXXVI, fig. 17*a*, *k*.

Stat. 99. June 28/29/30. 6° 7′.5 N., 120° 26′ E. Anchorage off North-Ubian. 16—23 m. Lithothamnion. 1 egg-bearing female without large cheliped.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Reef. 1 egg-bearing female.
Stat. 315. February 17/18. Anchorage East of Sailus Besar, Paternoster-islands. Depth up to 36 m. Coral and Lithothamnion. 1 male.

Some remarks about the collected specimens will be, no doubt, useful, because this species is closely related to *A. clypeatus* Cout.

The male from the Paternoster-islands is still young, 12,5 mm. long, for this species attains the length of 25 mm. There is an obtuse, median carina between the eyes, beyond which it does not reach; this carina is obliquely directed downward and, curving quite anteriorly suddenly downward, ends in a minute, triangular rostrum, which is 0,066 mm. long and hardly broader at its base; the length of the rostrum is only one-sixth the length of 1st antennular article, as far as it is visible from above. The slightly concave, anterior margin of the front curves laterally to the lateral margins.

The 2nd joint of the antennular peduncle is one and a half as long as the visible part of the 1st and twice as long as broad, while the 3rd joint is as long as the 1st. The stylocerite, that reaches to the end of 1st article, terminates, about as in the figure 50 of Pl. LXXXVI of Coutière's paper on the Alpheidae of the Maldive and Laccadive Archipelagoes, 1905, in a slender spine which is half as long as the basal part. The antennal peduncle extends beyond that of the upper antennae by half the length of the 3rd article; the terminal spine of the scaphocerite extends almost to the end of the antennular peduncle and reaches with one-fourth of its length beyond the blade that extends almost to the middle of 3rd article. There is a very small spine on the anterior margin of the lower face of the basicerite; this spine is 0,14 mm. long, only twice as long as the minute rostrum.

According to Coutière the endopod of the caudal fan should be quite unarmed; in this specimen, however, one observes on its free margin 6 spines that increase in length from the first to the sixth, the sixth being 0,2 mm. long, twice as long as the first. Terminal joint of external maxillipeds 1,06 mm. long and 0,4 broad, 2,5-times as long as broad; the extremity

is obtuse, truncate and the margins are beset with long hairs; penultimate joint half as long as the terminal.

Inner margin of merus of the large cheliped terminating at the distal extremity in an acute tooth or lobe, the two other margins unarmed. The fingers of the large chela which is 6,8 mm. long, are hardly half as long as the palm. Of the small cheliped which is placed on the left side, the chela is half as long as that of the other, fingers a trifle shorter than the palm. The height (breadth) of the outer face of the palm is in proportion to its length as 7 : 8, but according to COUTIÈRE's figure (l. c. Pl. LXXXII, fig. 36*b*) this proportion should be in *A. clypeatus* as 7 : 10, the palm being here longer in proportion to its height; dactylus twice as long as broad. The carpal segments of the second legs are respectively 0,96 mm., 0,56 mm., 0,28 mm., 0,32 mm. and 0,56 mm. long; the chela is 0,74 mm. long, fingers about as long as the palm; in *A. clypeatus* the 2nd segment appears hardly shorter than the 1st, while in this specimen the 1st is more than one and a half as long as the 2nd. Merus of third legs almost 4-times as long as broad, appearing a little more slender than in *A. clypeatus*, and this is also the case with the following joints.

The female from Stat. 133 is 16 mm. long. The minute rostrum is smaller than in the male just described, it is only 0,04 mm. long, one-tenth the visible part of 1st antennular article; 2nd article almost twice as long as the visible part of the 1st. The distal spine of the scaphocerite extends with one-third of its length beyond the blade. The spinule on the basal joint of the outer antennae is 0,12 mm. long, 3-times as long as the rostrum. Of the large chela, situated on the left side, the fingers are decidedly shorter than half the length of the palm. While this chela is 5,5 mm. long, the smaller is not yet half as long, viz. 2,25 mm.; fingers much shorter than the palm. The other legs are as in the male. Just as in the male the inner uropod bears 6 or 7 spinules on the outer part of its free margin.

The carpal segments of the ova-bearing female, long 15,5 mm., from Stat. 99 are 0,9 mm., 0,46 mm., 0,26 mm., 0,28 mm. and 0,52 mm. long; chela 0,82 mm. long. In this specimen the 1st segment is almost twice as long as the 2nd. Inner uropod as in the preceding specimens.

General distribution: Loo Choo Islands (STIMPSON); Tahiti (ORTMANN, DE MAN); Kagoshima, Japan (ORTMANN); Ternate (DE MAN); Maldive and Laccadive Archipelagoes (COUTIÈRE).

† 26. *Alpheus Stanleyi* Cout. var. *dearmatus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 287.
Confer: H. COUTIÈRE, in: Bull. Soc. Philom. Paris. (9) Tome XI, 1908, p. 17.

Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 2 males.
Stat. 240. November 22 till December 1. Banda-anchorage. Black sand, coral and Lithothamnion-bank in 18—36 m. 1 male.

It is not clear in COUTIÈRE's description of *A. Stanleyi* whether the merus of the fourth legs is also armed with a strong spine, like that of the third; at my request Professor COUTIÈRE, however, kindly wrote me "que la 4me paire a le méropodite épineux comme la 3me." It is therefore that the specimens collected by the "Siboga" are regarded as a variety, because

the merus of the fourth legs appears unarmed: it is, indeed, only by means of the microscope that one observes a trace of an extremely small, rudimentary tooth. The merus of third legs, however, bears a strong acute tooth at the apex. My attention was also drawn by him to a typographical error in the relative measurements of the small chela, the height being 0,72, not 1,72.

The largest specimen is one from Stat. 152, the specimen from Banda has nearly the same size, while the other specimen from Wunoh-bay is the smallest of all; all the specimens are of a smaller size than the single individual, long 18 mm., on which this species was established. Except the rostrum the frontal region much resembles that of *A. frontalis* H. M.-Edw., while the resemblance to *A. superciliaris* Cout. is still greater. The acute triangular rostrum that almost reaches to the end of basal antennular article, arises from a protruding part of the front like in these species and at either side of the rostrum the frontal margin runs S-like towards the rounded orbital hoods, that are greatly prominent laterally. Rostral carina compressed, sharp, disappearing at the base of the orbital hoods, from which it is separated by rather deep grooves. Antennular peduncle and stylocerite as in *A. superciliaris*. Carpocerite extending beyond the tip of the antennular peduncle by half the 3rd article; the terminal spine of the scaphocerite extends, in the largest specimen from Stat. 152, almost to the end of the antennular peduncle, while the narrow blade reaches to the 2nd third part of 3rd antennular article, in the younger specimen to the end of median article.

As is proved by the measurements, the telson appears in the youngest specimen 4-times, in the two other ones 3,6-times as long as the posterior margin is broad and in the still larger type specimen of the typical species 3,27-times: the telson probably therefore not differs from that of the typical species. Posterior margin as in *A. superciliaris*, outer angles acute, not prominent, spinules of the upper surface situated near the lateral margins.

Except in the largest specimen, both chelipeds are present; in the male from Banda the larger cheliped is situated at the left, in the other specimen at the right side. Merus of the large cheliped of the Banda male stout, twice as long as the outer surface is broad, the infero-internal margin terminates in a small, acute tooth, while the upper margin ends in a compressed tooth, that appears acute in a lateral view, but rather obtuse, when looked at from above. Relative dimensions of the chela: fingers 1; total length 3,3 or 3,4; height 1,27. The chela therefore seems to agree with that of the typical species, dactylus as in *A. ovaliceps*, but the tip distinctly truncate.

In the male from Banda the large chela is 2,5-times as long as the other. Merus of small cheliped not shorter than that of the large, but it is 2,5-times as long as broad; infero-internal margin unarmed, upper margin as in the merus of the other cheliped. The smaller chela seems also to agree with that of the typical species, its relative dimensions are: fingers 1, total length 2, height 0,64 and the fingers show exactly the features of *A. Stanleyi*. Merus of second legs in the male from Banda 6,6-times, in the younger specimen from Stat. 152 5,7-times longer than wide, appearing in the latter less slender. In the Banda male the carpus is 1,36-times, in the younger specimen from Stat. 152 1,28-times as long as the merus; in the Banda male the carpal segments are 0,9 mm., 0,8 mm., 0,28 mm., 0,28 mm. and 0,46 mm.

long, in the other specimen: 0,66 mm., 0,54 mm., 0,19 mm., 0,21 mm. and 0,32 mm.; in this specimen the second segment appears 2,7-times, in the Banda specimen 3,5-times as long as thick, the third and the fourth segment are almost as thick as long and the fifth is 1,7-times as long as thick at its far end. The chela, 1,15 mm. long in the Banda male and 0,88 mm. in the other, appears one-third longer than the first segment of the carpus; the fingers are a little more than one and a half as long as the palm, which is almost one and a half as long as wide. As results from the Table of measurements, the relative dimensions of the 3rd legs agree pretty well with those of the typical species, viz.: merus 2,25; carpus 1; propodus 1,4. The merus is armed with a strong acute tooth, directed obliquely forward, the propodus bears 7 or 8 spinules, that slightly increase in length and the three or four last of which are double. Dactylus very short, hardly one-fourth of the propodus.

The 4th legs that are characteristic of this variety have been described above.

The specimens from Stat. 152 are 14 mm. and 9,5 mm. long, the male from Banda 13 mm.

Table A.

	N° 1.	N° 2.	N° 3.
Proportion between length of telson and width of posterior margin	3,6	3,57	4
Proportion between the width at base and that of posterior margin		1,85	2
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,9	2	2
Proportion between the distances of both pairs of spinules from the posterior margin	2,1	1,8	1,9

Table B.

		N° 1.	N° 2.	N° 3.
Relative dimensions of merus of third legs		2,1	2,1	2,3
Relative dimensions of carpus of third legs		1	1	1
Relative dimensions of propodus of third legs		1,4	1,4	1,5
Proportion between length and width of merus		5	4,46	4,6
Proportion between length and width of propodus		5	5,4	4,8
Relative dimensions of merus of fourth legs		2,45	2,36	2,33
Relative dimensions of carpus of fourth legs		1	1	1
Relative dimensions of propodus of fourth legs		1,5	1,5	1,5
Proportion between length and width of merus		5,6	5,4	5,2
Proportion between length and width of proprodus		6	6	6

† 27. *Alpheus frontalis* H. M.-Edw.

Alpheus frontalis H. Milne-Edwards, Hist. Nat. Crust. II, 1837, p. 356.
Alpheus frontalis G. Cuvier, Règne animal. Crustacés. Pl. 53, fig. 2.
Alpheus frontalis A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 488 and in: Jenaische Denkschriften, VIII, 1894, p. 15.
Alpheus frontalis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 899.
Alpheus latifrons A. Milne-Edwards, Journal des Museums Godeffroy. 1874, p. 11.
Alpheus latifrons J. G. de Man, in: Archiv f. Naturg. 53. Jahrg. 1888, p. 521, Pl. XXII, fig. 4 and in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 758, Taf. 36, fig. 67 and in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 876.

Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. Depth 27 m. and less. Coral and coralsand. 1 egg-bearing female of small size and 2 still younger specimens.
Stat. 53. April 21/22. Bay of Nangamessi, Sumba. Depth up to 36 m. Coralsand, near the shore mud. 1 young male and 1 egg-bearing female of the same size.
Stat. 60. April 27/28. Haingsisi, Samau Island, Timor. Reef. 1 adult male.
Stat. 61. May 1/2. Lamakera, Solor-island. Reef. 1 egg-bearing female of small size.
Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. Reef. 1 adult male and 1 adult female without eggs.
Stat. 115. July 9/11. East side of Pajunga Island, Kwandang-bay. Reef. 2 adult males.
Stat. 131. July 24/25. Anchorage off Beo, Karakelang-islands. Reef. 1 young specimen.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 3 young males and 3 young females, collected on the reef, except one that was captured at a depth of 36 m., where the bottom was mud and hard sand.
Stat. 209. September 23. Anchorage off the south point of Kabaëna-island. Reef. 1 male and 1 egg-bearing female, both of medium size.
Stat. 213. October. Pulu Pasi Tanette. Reef. 19 specimens, adult males, egg-bearing females and younger specimens; some of these specimens are contained in yellow brown felted tubes formed by Oscillariae.
Stat. 220. November 1/3. Anchorage off Pasir Pandjang, West coast of Binongka. Reef. 1 male of medium size and 1 younger specimen contained in a tube.
Stat. 240. November 22 till December 1. Banda-anchorage. Black sand, coral and Lithothamnion-bank in 18—36 m. 5 young specimens.
Stat. 250. December 6/7. Kur--island. 27 m. Coral and Lithothamnion. 1 young specimen.
Stat. 261. December 16/18. Elat, West coast of Great Kei-island. Reef. 1 adult, egg-bearing female.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 4 young specimens.
Stat. 285. January 18. 8° 39′.1 S., 127° 4′.4 E. Anchorage South coast of Timor. 34 m. On the limit between mud and coral. Lithothamnion. 1 very young specimen.
Stat. 301. January 30—February 1. 10° 38′ S., 123° 25′.2 E. Pepela-bay, East coast of Rotti-island. Reef. 2 young males.
Stat. 313. February 14/16. Anchorage East of Dangar Besar, Saleh-bay. Reef. 1 young specimen, in an Oscillaria-tube.

The fact, already contended by Dr. ORTMANN in 1894 that *A. latifrons* A. M.-Edw. should be identical with *A. frontalis* H. M.-Edw., was verified by COUTIÈRE in 1900 (Bull. Muséum Paris, N° 8, p. 414) and also in 1905 in his important work on the Alpheidae of the Maldive and Laccadive Archipelagoes. The remarkable manner of life of this species in felted tubes formed by Oscillariae, first observed by RICHTERS in 1880, when he described his *Betaeus utricola*, which is identical with this species, afterwards, l. c. 1888, by myself on specimens from Amboina, is also shown by the specimens that were collected by the "Siboga" at Pulu Pasi Tanette near the island of Saleyer and at Stat. 220 and 313. The tubes are 20—30 centim. long. It is quite remarkable that they were not observed by COUTIÈRE.

The form of the front, of the anterior margin of the carapace, is rather variable in this species. In the adult male from Haingsisi, which is 38 mm. long, the front extends as far forward as the basal joint of the outer antennae; it is arcuate, slightly emarginate in the middle and laterally near the outer angles. In an adult, egg-bearing female from Stat. 213 the front is a little more prominent, not emarginate in the middle and the lateral emarginations are less conspicuous than usually; the lateral walls run, from the front to the orbits, more obliquely than in the male from Haingsisi. In the adult, egg-bearing female from the Kei Islands, which is

48 mm. long, finally, the front presents again another form: the lateral emarginations are larger, so that the median part of the front appears less broad than usually and it is also emarginate in the middle. In the specimen from Stat. 285, only 9 mm. long, the median carina between the eyes is rather prominent.

I will still add that in the three posterior legs the ischium is armed with a movable spine, inserted on a concavity of the lower border.

The largest ova-bearing specimens from Stat. 213, that are contained in the tubes of Oscillariae, are 50 mm. long; the females bear, however, already eggs at a much younger age: so e. g. the egg-bearing female from Stat. 37 which is 21 mm. long and that from Stat. 131, the length of which is only 15 mm.! The eggs are globular; those of the large females from Stat. 213 are 0,75 mm. broad, whereas the eggs, few in number, of the small specimen from Stat. 131 show a diameter of 0,62 mm.

General distribution: New Holland (H. Milne-Edwards); Samoa Islands (A. Milne-Edwards, Ortmann); Tahiti (Heller); Liu-kiu-islands (Ortmann); Celebes (de Man); Amboina (de Man, Ortmann); Ternate (de Man); Java Sea (de Man); Atjeh (de Man); Mauritius (Richters).

III c. *Insignis* subgroup.

†28. *Alpheus bidens* (Oliv.).

Alpheus bidens (Olivier) H. Milne-Edwards, in: Hist. Nat. Crustacés. II, 1837, p. 353, Pl. 24, fig. 11 and 12.
Alpheus tridentatus L. Zehntner, Crustacés de l'Archipel Malais. Genève 1894, p. 204, Pl. VIII, fig. 24.
Confer: H. Coutière, Les Alphéidae. Paris, 1899, figs. 57 and 274.

Stat. 131. July 24/25. Anchorage off Beo, Karakelang-islands. Reef. 7 specimens, among which 1 male and 2 egg-bearing females.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Reef. 1 male.
Stat. 154. August 14. 0°7′.2 N., 130° 25′.5 E. Bougainville Strait. 83 m. Grey muddy sand, shells and Lithothamnion. 1 female without eggs.
Stat. 240. November 22 till December 1. Banda-anchorage. From 9—45 m. Black sand, coral. Lithothamnion-bank in 18—36 m. 2 specimens, one of which is egg-bearing.
Stat. 282. January 15/17. 8° 25′.2 S., 127° 18′.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 female without eggs.

H. Milne-Edwards and Coutière are, as far as I know, the only authors that have observed this rare species, though it must be remarked that Zehntner's *A. tridentatus* is identical with *A. bidens*, as was already suggested by Coutière (Bull. Muséum Paris 1897, N° 7, p. 303) and as I was able to verify by the examination of both specimens of Zehntner, kindly sent me by the Direction of the Museum at Geneva. Dr. Zehntner's description proved to be not quite exact in a few particulars. In both specimens the carpocerite reaches only to the 2nd third part of 3rd antennular article. In the female the 1st article of the right antennular peduncle bears two spines, as in the specimens collected by the "Siboga"; that of the left peduncle bears only one and this is also the case with the two peduncles of the younger individual. The two first carpal segments of the second legs, finally, are not of equal length, but,

as in the specimens collected by the "Siboga", the 2nd is slightly longer than the 1st: the carpal segments of the right leg of the female, indeed, measure 1,6 mm., 1,72 mm., 0,6 mm., 0,7 mm. and 0,9 mm., while the chela is 1,36 mm. long (palm 0,54 mm., fingers 0,82 mm.).

According to H. MILNE-EDWARDS *A. bidens* should attain a length of 3 inches, while for *A. tridentatus* the length of 23 mm. is indicated. The specimens collected by the "Siboga" are all of a much smaller size, the largest male and the largest egg-bearing female being 23 mm. resp. 23,5 mm. long. The rostrum reaches to the 2nd third part of the 2nd antennular article, the tooth on the post-rostral carina is small and subacute. Just in front of this tooth one observes at either side an acuminate and pointed tooth, the basal part of which is broad and flattened; these teeth appear more acute and more pointed than in COUTIÈRE's figure 57. Orbits prominent, terminating in an obtuse point or tooth, though no spine; between these teeth and the rostrum the frontal margin presents at either side a dentiform, obtuse prominence.

Basal joint of caudal swimmerets ending in two strong spines, the outer of which is a little longer than the other.

Second antennular article almost one and a half as long as the visible part of the 1st and almost twice as long as thick. So e. g. in the male from Stat. 133, which is 23,5 mm. long, the 2nd article is 1,1 mm. long and 0,58 mm. thick, while the visible part of 1st article is 0,85 mm. long. According to ZEHNTNER the anterior margin of 1st antennular article should bear a small spine: in all the specimens captured by the "Siboga" one observes here two small spines placed near one another, which measure one-fourth the length of the 2nd article and the outer of which is slightly longer than the other; these spines reach almost or just as far forward as the pointed spine in which ends the stylocerite, but sometimes the stylocerite and these spines are slightly shorter. Third article nearly as long as the visible part of the 1st.

Antennal peduncle usually reaching to the middle of 3rd antennular article, sometimes, as in the egg-bearing female from Stat. 240 and as in the specimen from Stat. 154, only to the end of the 2nd article. As far as I am aware, the male of *A. bidens* was still unknown, for COUTIÈRE does not mention *A. bidens* among the species of the *Crinitus* group, in which the small chela shows the *Balaeniceps*-form (COUTIÈRE, l. c. p. 228). In this species, however, it is really the case. In the male from Stat. 133 the small cheliped is situated at the right side. The upper margin of the merus ends in a strong, spiniform tooth, the two other margins are unarmed. The anterior margin of the carpus bears above two rounded lobes, that are separated by notches from one another and from the contiguous parts of the anterior margin. The chela is turned outward, so that the upper margin is situated externally and the fingers are horizontal; the upper margin of the palm, which is hardly longer than the fingers, is marked with a very short, transverse groove, just behind the articulation of the dactylus and, at either side of the latter, one observes an acute tooth, the tooth at the inner (upper) side being larger than the other. The dactylus shows quite conspicuously the characteristic *Balaeniceps*-form, the arched upper surface of this finger appears, between the hairy lateral carinae, very obtusely carinate longitudinally. The inner (upper) surface of the chela is covered with long, fine hairs.

The fingers of the female have the usual slender form and are as long as or a little

shorter than the palm; the dactylus is, however, distinctly ridged longitudinally above, from the articulation to the tip. The palm bears no trace of a transverse groove near the articulation of the fingers, but the teeth at either side of the articulation are present, like in the male, and the inner (upper) surface of the chela is also hairy. The large chela fully agrees with COUTIÈRE's figure 274, p. 226, l. c.

In an adult, ova-bearing female from Stat. 131 the carpal segments of the 2nd legs are respectively 1,5 mm., 1,68 mm., 0,6 mm., 0,6 mm. and 0,86 mm. long; the chela is 1,34 mm. long and the fingers are one and a half as long as the palm.

In the 3rd and 4th legs one observes a movable spine near the proximal extremity of the lower border of the ischium; the merus bears a strong, subapical, acute tooth on the lower margin and the lower margin of the carpus ends in two acute teeth, of which the outer is broader but shorter than the other. Propodus of 3rd pair 6-times as long as broad, with 7 spines on the lower margin, another row of 6 spines close to the former on the outer side and also a spine at the far end of the upper margin. Dactylus slender, tapering, measuring one-third the length of the propodus.

General distribution: Asiatic seas (H. MILNE-EDWARDS); Amboina (ZEHNTNER).

†29. *Alpheus praedator* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 103.

Stat. 181. September 5/11. Ambon. Reef. 1 specimen.

A new species of the *Insignis* subgroup, closely related to *A. bidens* (Oliv.) = *tridentatus* Zehntner. The single specimen collected is 14 mm. long; it is perhaps a young female, because the fingers of the small chela are not *Balaeniceps*-shaped, while this is the case in the male of the closely allied *A. bidens*.

Rostrum pointed, acute, narrow, half as broad at its base as it is long, slightly directed upward and reaching to the middle of 2nd antennular article. As in *A. bidens*, the rostral carina is interrupted at the anterior third of the carapace (rostrum excluded); the interorbital portion, partly concealed by the eye-hoods from which it is separated by deep grooves, half as broad as the corneae, is strongly compressed, sharp-edged and, differently from *A. bidens*, arises, between the posterior end of the corneae and the interruption, as a high, arcuate crest. Immediately behind the interruption one observes an obtuse tubercle like in *A. bidens* and this tubercle is prolonged, in the mid-line of the carapace, into a straight obtuse crest, that extends to the posterior third of the carapace (rostrum excluded); this crest is bounded at either side by a shallow groove or depression, which also ends abruptly at the posterior extremity of the crest, so that the latter shows the same height along its whole length. Viewed at from above the crest appears thicker than that part of the rostral carina, which is situated in front of the interruption. Just as in *A. bidens*, one observes, at either side of the rostral carina, between the corneae and the median tubercle, a pointed tooth, broad and flattened at its base, the acuminate tip of which is slightly directed inward; the sharp-edged, concave, inner margin of these teeth extends to a little behind the median tubercle, but the

outer margin is much shorter. Like in *A. bidens*, the orbital region is very broad, occupying four-fifths of the anterior margin of the carapace, the eye-hoods end anteriorly in an obtuse tubercle and one observes also, between that tubercle and the rostrum, a rounded prominence that reaches a little farther forward than the tubercle of the eye-hoods.

Telson twice as long (2 mm.) as broad anteriorly (1,05 mm.), distance (0,7 mm.) between the postero-lateral angles one-third of the length; spinules of the upper surface large, the anterior pair situated at the anterior third, the posterior pair a little farther distant from the posterior margin than from the anterior pair. The two spines of the basal joint are of equal length, the outer twice as broad as the inner.

Second antennular article one and a half as long as broad, little longer than the visible part of the 1st, which is as long as the 3rd; like in *A. bidens* the anterior margin of the 1st article bears 2 spines. Stylocerite ending in a spine that is directed outward and that reaches as far forward as the spines of the 1st article, i. e. to the 2nd fourth part of 2nd antennular article.

Lower spine of the basicerite small, hardly reaching as far forward as the base of the spine in which terminates the stylocerite; carpocerite as long as the antennular peduncle. The scaphocerite, the outer margin of which is decidedly concave, projects beyond the end of the antennular peduncle by half the 3rd article; the terminal spine, the tip of which is curved inward, is a little more than half as long as the scaphocerite, projects with one-third of its length beyond the tip of the blade, that reaches to the end of the antennular peduncle, and the spine appears 3-times as long as its base is broad. The base of the spine is as broad as the contiguous part of the blade. External maxillipeds extending as far forward as the carpocerite; penultimate joint one and a half as long as thick, the seta at the far end of the upper margin 3-times as long; terminal joint almost twice as long as the penultimate and almost 4-times as long as broad at its base.

Merus of the large cheliped stout, deeply concave at the distal extremity, the upper margin terminating in a triangular, acute tooth; the greatest width anteriorly of the outer surface is a little more than half its length. Infero-external margin of the merus rather coarsely denticulate or serrulate along its whole length, infero-internal with an acute tooth at the distal end; margins of the distal tooth of the upper margin with two or three setae. Large chela turned outward, 6 mm. long, one-fifth longer than the carapace; palm measuring three-fifths the length of the chela, the height (2,25 mm.) of its outer (lower) face a little more than one-third the length of the chela and equal to the length of the fingers. Upper (outer) border of the palm the thickness of which is in proportion to its height like 3 : 4, marked with a narrow, deep groove, near the articulation of the dactylus, as in *A. bidens*, but this groove is continued on the outer (lower) face of the palm to near the entire and rounded lower border of the latter. From the middle of this external portion of the groove a broad, though shallow depression extends almost to the middle of the palm, to near the obtuse tip of the triangular area, the upper boundary of which is arcuate, the lower nearly straight. The upper (outer) border of the palm is rounded and ends obtusely. The dactylus is still more turned outward than the palm, so that the articulation is situated in the plane of the outer (lower) surface of the palm and the upper border of the dactylus situated almost inferiorly.

At either side of the articulation the palm ends in an obtuse tooth, the tooth at the end of the upper (outer) border being larger than the other; immobile finger shorter than the dactylus and longitudinally grooved on its outer (lower) face. On the outer (lower) surface of the palm a few short hairs are inserted, but the inner (upper) is more hairy, especially on its upper (outer) portion and on the immobile finger. Lower (inner) border of the chela rounded, entire.

Merus of the small cheliped less broad in proportion to its length than that of the larger, upper margin terminating in an acute tooth, infero-internal unarmed. Chela half as long as the larger, also turned outward; fingers conical, shutting together, as long or hardly shorter than the palm, the margins of which are parallel, entire; inner (upper) surface of palm and fingers hairy.

Carpal segments of the second legs 1 mm., 1,1 mm., 0,32 mm., 0,36 mm. and 0,54 mm. long; chela 1,06 mm. (palm 0,46 mm., fingers 0,6 mm.). The carpus much resembles that of *A. bidens*, but the chela is twice as long as the 5th segment, in *A. bidens* only one and a half.

Ischium of 3rd and 4th legs with a strong, movable spine. These legs are of a stouter shape than those of *A. bidens*. So e. g. the meri of 3rd legs are 2,4 mm. long and 0,6 mm. broad in the middle, 4-times as long as broad. As well in the 3rd as in the 4th legs the meri are armed with a strong, acute, apical tooth; posterior margin of the carpus with two acute teeth at the distal extremity, as in *A. bidens*, anterior margin with a few long setae. Propodus of 3rd legs straight, slightly narrowing, one-third longer than the carpus and 4,5-times as long as wide, appearing also of a less slender form than in *A. bidens*; posterior margin with 7 strong spines and with another row of shorter spines near them, there is also a spine at the far end of the setose, anterior margin. Dactylus of 3rd legs measuring two-fifths of the propodus, 5-times as long as thick at base, slightly curved, simple.

†30. *Alpheus bicostatus* de Man.

J. G. de MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 102.

Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. Close to reef. 27 m. and less. Coral and coralsand. 1 male and 4 egg-bearing females.

Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion. 1 adult egg-bearing female and 7 young specimens, 6 of which were collected at the surface.

Stat. 205. September 20. Buton-strait, between floating seaweed. 1 adult male and 1 ova-bearing female.

A new species of the *Insignis* subgroup of COUTIÈRE, closely related to *A. bidens* (Oliv.), *A. cristatus* Cout. and *A. praedator* de Man.

The rostrum, acute and narrow, reaches to the distal fourth or fifth of the visible part of 1st antennular article or extends to the end of this article, sometimes even just beyond it, as in the egg-bearing female from Stat. 37. Rostral carina subacute, sometimes rather obtuse and less prominent than the orbits, so that in a lateral view of the carapace the carina is partly concealed by the orbital hoods. The rostral carina usually extends backward as far as a small

median tubercle, which, as in *A. bidens* (Oliv.), is situated immediately behind the base of the orbits: sometimes, however, the rostral crest reaches only as far as the origin of the two oblique, lateral carinae, between which the carapace appears then flat and even. From the small tubercle a low, obtuse, median carina runs backward to the middle of the carapace, more conspicuously in young specimens than in the adult. Just midway between the median tubercle and the anterior margin of the carapace, at either side of the rostral carina, a thin lamellar crest runs obliquely backward from the rostral carina to the level of the median tubercle; these two crests, the upper edge of which is rather sharp and that are marked with 2 or 3 violet spots, are bounding, posteriorly and from the inner side, the rather deep grooves or depressions which separate the orbits from the rostral carina. The two crests or ribs from which the specific name is derived, make an angle of nearly 45° with the rostral carina. The orbital hoods that are rather much prominent, terminate anteriorly in an obtuse tubercle, about as in *A. bidens*; just near that tubercle and separated from it by a notch or emargination the frontal margin carries, at either side of the rostrum, a slender spine like in *A. cristatus* (vide: COUTIÈRE, Les Alphéidae, 1899, p. 89, fig. 56); these spines measure one-third the length of the rostrum. Between the rostrum and either spine the frontal margin runs S-like and is fringed with long setae that reach to the end of 1st antennular article. Orbito-antennal groove deep.

According to COUTIÈRE (Les Alphéidae, 1899, p. 79 and p. 336) a pterygostomian spine should not occur in the genus *Alpheus*. *A. bicostatus* appears now quite remarkable by the existence of a well-developed, acute, though small, pterygostomian spine.

Second article of the stout antennular peduncle as long as the visible part of the 1st, sometimes slightly shorter, sometimes slightly longer, 3rd article two-thirds of the 2nd; anterior margin of the articles with long setae, anterior margin of 1st article not bearing the spines which in *A. bidens* are found here. Stylocerite terminating in a slender spine, that just reaches beyond the 1st antennular article. Basicerite with a small, infero-lateral spine, that reaches almost to the tip of 1st antennular article; carpocerite stout, distinctly shorter than the antennular peduncle, reaching to the 2nd third or to the middle of the 3rd article. Like the antennal and antennular peduncles, the scaphocerite also resembles that of *A. bidens*; the lateral spine, in which the concave, outer margin terminates and which is slightly curved inward, reaches distinctly beyond the tip of the antennular peduncle, while the blade, fringed with hairs, is just as long as that peduncle.

Merus of the large cheliped of the male rather stout, its outer face twice as long as broad; both the upper and the inner margin end in an acute tooth, but they are for the rest entire and unarmed. The large chela of the male, which much resembles that of *A. bidens*, is half as long as the body and turned outward, the dactylus being placed at the outer side; viewed at from above, the chela appears little more than 3-times as long as the upper (inner) face of the palm is broad. This chela is perfectly smooth, but the upper (inner) side is slightly hairy; the rounded, outer (upper) border of the palm bears a narrow, transverse groove, just near the articulation of the dactylus, as in *A. bidens*, and this groove is not broader than the base of the dactylus; inner or lower border of the chela rounded, straight and entire. Fingers little more than half as long as the palm, dactylus compressed, slightly longer than the immobile

finger, tip of the latter rather obtuse. The large cheliped of the female agrees with that of the male, but the merus is a little less broad in proportion to its length and the length of the chela is only one-third that of the body.

Merus of the small cheliped of the male a little less broad in regard to its length than that of the larger, outer face 2,5-times as long as broad; the upper margin ends in a pointed tooth, but the inner is unarmed. The carpus and the chela, which also shows the *Balaeniceps*-form, closely resemble those of *A. bidens*, but the palm bears no trace of a transverse groove near the dactylus and the leaf-shaped, upper face of this finger is comparatively broader than in the male of *A. bidens*. In the male of *A. bidens* from Stat. 133 the length of this upper part of the dactylus is in proportion to its width as 26 : 10, in *A. bicostatus*, however, as 18 : 10. In *A. bidens* this upper face of the dactylus appears convex transversely, but in *A. bicostatus* rather flattened.

The small cheliped of the female resembles that of *A. bidens*, the conical fingers are but little shorter than the palm, that presents no trace of a transverse groove near the dactylus; the upper (inner) face of the chela is hairy, as in the male.

In the right leg of the second pair of the male (from Buton-strait) the carpal segments are 1,2 mm., 1,45 mm., 0,56 mm., 0,68 mm. and 0,8 mm. long, the chela is 1,32 mm. long (palm 0,54 mm., fingers 0,78 mm.); in the left leg these numbers are, in the same succession, 1,2 mm., 1,3 mm., 0,56 mm., 0,66 mm. and 0,76 mm., the chela just as long as in the other leg. The second segment appears little longer than the first, in the right leg the difference is larger than in the left. Ischium of 3rd legs with a strong, movable spine. Merus 4,5-times as long as wide in the middle, with a strong acute tooth near the far end of the posterior margin; carpus about half as long as the merus, posterior margin ending in an acute tooth, anterior with some long setae. Propodus slender, with 6—8 spines on the posterior margin and some others near the margin on the outer face; anterior margin setose, with 2 or 3 long and strong setae at the distal extremity. Dactylus slender, simple.

Fourth legs as the 3rd, but the merus comparatively less broad.

The distal third part of the dactylus of the large cheliped and the tip of the other finger are violet; the fingers of the small cheliped of the male are marked with violet spots at their margins, while in the female these fingers are violet on the distal third part with paler tips.

Length of the male 18,5 mm., of the female 20,5 mm.; the smallest, egg-bearing specimen is 14,5 mm. long.

31. *Alpheus insignis* Heller.

Alpheus insignis C. Heller, in: Sitzungsber. Kais. Akad. Wiss. Wien. Bd. XLIV, 1861, p. 269, Taf. III, figg. 17, 18.
Alpheus insignis J. G. de Man, in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 864, Taf. XXVI, figg. 60, 60*a*, 60*b*.
Alpheus insignis H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 899.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 male and 1 female without eggs.

The male is 17 mm. long, this species attains the length of 20 mm.; the female that has lost the left larger cheliped, measures 12,5 mm. In the male the rostrum reaches to the middle, in the female nearly to the end of 1st antennular article. In the female the rostrum appears a little narrower than in the male; at the middle of the corneae the rostrum appears, in the female, a little less broad, but in the male slightly broader than the distance between the concave, lateral margins and the corneae, the female agreeing with that from Ternate, figured by me l. c. Fig. 60. In the male the small cheliped is placed at the left, in the female at the right side. In the male the carpal segments of the right leg of the second pair are 1,1 mm., 1,16 mm., 0,4 mm., 0,42 mm. and 0,7 mm. long, the chela is 1,34 mm. long (palm 0,6 mm., fingers 0,74 mm.). In the female these numbers are: 0,8 mm., 0,9 mm., 0,36 mm., 0,34 mm. and 0,5 mm.; the chela is 1,02 mm. long (palm 0,5 mm., fingers 0,52 mm.).

General distribution: Red Sea (Heller, de Man); Eritrea (Nobili); Djibouti (Coutière); Mallicolo (Coutière); Mauritius (Richters); Mahé (Coutière); Maldives and Laccadives (Coutière); Ternate (de Man); Amboina (de Man); New Guinea, Beagle Bay (Nobili); Samoa (Coutière).

† 32. *Alpheus Philoctetes* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 103.

Stat. 240. November 22 till December 1. Banda-anchorage. Black sand, coral and Lithothamnion-bank in 18—36 m. 1 specimen.

A new species apparently belonging to the *Insignis* subgroup for, though the large cheliped is missing, it appears closely related to *A. Lanceloti* Cout., a species inhabiting the Maldive and Laccadive Archipelagoes. From this species *A. Philoctetes*, however, at first sight differs by the meri of the 3rd and 4th legs that are armed with an acute tooth at the distal extremity of their posterior margin.

Rostrum acute, as long as broad at its base, projecting straightly forward almost to the end of 1st antennular article; upper margin of the rostrum rather sharp, like the interorbital part, which, separated by narrow grooves from the rounded, unarmed, orbital hoods, becomes posteriorly obtuse, gradually widening and reaching to the end of the orbits; as in *A. Lanceloti* the integument appears, at either side of the rostrum, anteriorly rather thin. Frontal margin straight, transverse as in *A. Lanceloti*.

The telson closely resembles that of this species. As it is 1,86 mm. long and the posterior margin 0,64 mm. wide, the telson appears, like in *A. Lanceloti*, almost 3-times as long as the posterior margin is broad and anteriorly it appears just one and a half as broad as the posterior margin; the form is also quite the same. The anterior pair of spinules, long 0,24 mm., of the upper surface are twice as far distant from the posterior margin as from the base and the distance, 0,48 mm., between the two pairs is one-fifth shorter than the distance, 0,6 mm., of the anterior pair from the base of the telson; the spinules of the anterior pair are one and a half as far distant from one another as those of the posterior. Of the two spines near the postero-lateral angles the inner ones are as long as in *A. Lanceloti*, namely just

half as long as the posterior margin is broad; between these spines the margin is armed with a dozen of movable spinules that measure one-third the length of the longer inner spines near the postero-lateral angles and below these spines the long plumose setae are inserted. Spines of the basal joint of swimmerets large, the outer somewhat longer than the inner.

Second antennular article almost twice as long (0,56 mm.) as thick (0,32 mm.) and one-fifth longer only than the visible part (0,46 mm.) of 1st article; 3rd article a little shorter than the visible part of the 1st. Stylocerite terminating in a spine, that just reaches beyond the 1st article.

Basicerite with a well-developed spine, long 0,2 mm. Carpocerite just as long as the antennular peduncle, not longer, scaphocerite resembling that of *A. Lanceloti* and reaching a little beyond the peduncles. Terminal joint of external maxillipeds almost 3-times as long as broad at its base.

Ischium of the small cheliped with two microscopical, movable spinules on the lower margin, the anterior, 0,06 mm. long, one and a half as long as the posterior. Merus 3,5-times as long as broad, upper margin unarmed; infero-internal margin armed with four movable spinules, that progressively increase in length, the 1st or proximal spinule being 0,07 mm. long, the 4th 0,22 mm., and with a hardly visible, rudimentary tooth or spine at the far end. Carpus and chela as in *A. Lanceloti*, chela somewhat more than 4-times as long as high; fingers as long as the palm, the latter with a small obtuse tooth at the far end at the inner side, near the articulation of the dactylus; lower half of the palm and immovable finger hairy.

The very slender left leg of the second pair (the right is missing) is 2,2-times as long as the carapace, rostrum included; the merus, 2,5 mm. long, is 14-times as long as broad. Carpal segments 0,84 mm., 1,2 mm., 0,62 mm., 0,76 mm. and 0,5 mm. long, the second segment 8-times, the third 4-times as long as thick; chela 0,88 mm. (palm 0,38 mm., fingers 0,5 mm.) long. The second segment of the slender carpus is almost one and a half as long as the first and the fourth is not shorter, but one and a half as long as the fifth; the fingers which, according to Coutière's figure 39*c* should be shorter than the palm in *A. Lanceloti*, are in this new species distinctly longer than it, almost one and a half as long.

Ischium of 3rd and 4th legs with a strong movable spine, long 0,32 mm. Merus of 3rd legs five times as long as broad in the middle, its posterior margin armed with four movable spinules that increase in length; the very small first spinule is 0,07 mm. long, the second 0,1 mm., the third 0,13 mm., the fourth 0,15 mm., the length of the last hardly more than one-third the width of the joint; the third is as far distant from the distal extremity as the second from the proximal one. At the distal extremity this margin terminates in a small, though quite distinct, acute tooth, as in *A. Miersi*; carpus slender, unarmed, 4-times as long as thick distally, its anterior margin with some setae, one of which near the far end is as long as the carpus itself. Propodus 6-times as long as broad, 1,25-times as long as the carpus, its posterior margin with 6 pairs of spinules; both margins are setose, two or three setae near the anterior margin are plumose. Dactylus two-fifths of the propodus, half as long as the carpus, simple. Merus of 4th legs also 5-times as long as broad, resembling that of the 3rd, but its posterior margin with three, instead of four, movable

spinules; following joints as in the 3rd legs, but the lower margin of the carpus ends in an acute tooth.

Length of the single, probably young specimen, 14 mm.

Remarks. *Alpheus Miersi* Cout. differs at first sight by the less slender form of the carpal segments and by the meri of 3rd and 4th legs bearing no movable spinules. The unknown large chela will perhaps show still other differences, also from *A. Lanceloti*.

33. *Alpheus gracilipes* Stimps.

Alpheus gracilipes W. Stimpson, in: Proc. Acad. Nat. Scienc. Philadelphia, 1860, p. 31.
Alpheus gracilipes E. J. Miers, in: Report Zool. Coll. of H. M. S. "Alert", 1884, p. 287.
Alpheus gracilipes J. G. de Man, in: Archiv f. Naturg., 53. Jahrg. 1888, p. 500, Taf. XXI, fig. 5 and in: Abhandl. Senckenb. Naturf. Gesells. Bd. XXV, 1902, p. 864.
Alpheus gracilipes A. Ortmann, in: Zoolog. Jahrb. V, Abth. f. Syst. 1890, p. 488 and in: Jenaische Denkschriften VIII, 1894, p. 15.
Alpheus gracilipes H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 901.
Nec: *Alpheus gracilipes* J. Thallwitz, Decapoden-Studien. Berlin, 1891, p. 21.

Stat. 115. July 9/11. East side of Pajunga-island, Kwandang-bay. Reef. 4 specimens, 2 of which are egg-bearing.
Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 young specimen.
Stat. 154. August 14. 0° 7'.2 N., 130° 25'.5 E. Bougainville-strait. 83 m. Grey muddy sand, shells and Lithothamnion. 1 egg-bearing female.
Stat. 209. September 23. Anchorage off the south point of Kabaëna-island. 22 m. Coarse sand. 1 egg-bearing female.

As in *A. diadema* Dana and *A. insignis* Heller, the antennal peduncle appears, in this species, much shorter than the scaphocerite and reaches only to the tip of 2nd antennular article: in other species of this subgroup, as in *A. Lanceloti* Cout., *A. paracrinitus* Miers var. *bengalensis* Cout., *A. alpheopsides* Cout. and *A. paralpheopsides* Cout. the antennal peduncle is longer than the scaphocerite.

The largest specimen from Stat. 115 is a male, long 25,5 mm. The rostrum reaches to the end of 1st antennular article and its upper surface is decidedly concave. Only the small cheliped, at the left side, is present. The upper margin of the merus ends in an acute tooth, the outer margin is unarmed, but the inner bears 2 small spinules on its proximal half and a sharp tooth at the distal end, which, however, is smaller than that of the upper margin. The fingers are a little shorter than the palm, which is marked with a transverse groove just behind the articulation of the dactylus; the latter presents the *Balaeniceps*-form and the chela appears a little more than 4-times as long as broad (high).

The two egg-bearing females are 20 mm. long. The female without eggs from Stat. 152 is 13 mm. long. The large chela is not yet as slender as in the adult, being only about 3-times as long as high.

The female from Stat. 154 is 27,5 mm. long. There is a large cheliped lying loose in the tube, which no doubt belongs to this specimen. The upper margin of the merus ends in a small sharp tooth, that is much smaller than the acute tooth at the apex of the inner margin; between this tooth and the ischium the inner margin bears 3 or 4 smaller spinules,

the outer margin is unarmed but its distal extremity is rather sharp. The chela, 8,6 mm. long, closely resembles the figure 277 in COUTIÈRE's work: Les Alpheidae, 1899, p. 228. The propodi of the 3rd and 4th legs are armed with 10 spinules.

The egg-bearing female from Stat. 209 is 16,5 mm. long.

General distribution: Tahiti (STIMPSON, HELLER); Marquesas Islands (ORTMANN); Samoa Islands (ORTMANN); Hawaiian Islands (COUTIÈRE); New Caledonia (COUTIÈRE); Ternate (DE MAN); Amboina (DE MAN); Bay of Batavia (DE MAN); Ceylon (MIERS); Maledive Islands (COUTIÈRE); Mahé (COUTIÈRE); Djibouti (COUTIÈRE); Dar-es-Salaam (ORTMANN).

† 34. *Alpheus tenuicarpus* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 104.

Stat. 114. July 8. 0° 58'.5 N., 122° 55' E. Kwandang-bay-entrance. 75 m. Hard sand, very fine. 4 specimens, 1 of which is a male and 2 of which are egg-bearing.
Stat. 311. February 12/13. Sapeh-bay, East coast of Sumbawa. Depth up to 36 m. Mud and sand. 1 egg-bearing female.

A species of small size, appertaining to the *Insignis* subgroup or perhaps to the *Brevirostris* group and related to *A. paralpheopsides* Cout., a species that inhabits the Laccadive Archipelago. The male attains a length of 13 mm., while the female becomes 13,5 mm. long.

Frontal margin as in *A. paralpheopsides*. Rostrum pointed, acute, one-third longer than broad at its base and separated from the orbital hoods by a deep emargination, the lateral or outer margin of which makes a distinct angle with the anterior border of the orbits; the rostrum almost reaches to the middle of the visible part of 1st antennular article. Rostral carina sharp, little prominent, not reaching farther backward than the base of the orbits. Corneae rather large. Telson narrow, a little more than twice as long as broad anteriorly and 4-times as long as its posterior margin is broad; the two pairs of spinules are rather large and placed close to the lateral margins, anterior pair a little nearer to the base than to the posterior margin, posterior pair midway between the latter and the anterior pair; posterior margin arcuate, inner subterminal spines little more than half as long as this margin is broad.

Second antennular article twice as long as thick, as long as the visible part of the 1st and one and a half as long as the 3rd; stylocerite terminating in a pointed spine that almost reaches to the end of 1st antennular article.

Lower spine of the basicerite small, hardly reaching as far forward as the rostrum; carpocerite extending beyond the tip of the antennular peduncle by the length of 3rd article; scaphocerite 3-times as long as broad, its outer margin very slightly concave, the apex of the blade reaching to the end of the antennular peduncle, while the terminal spine that extends but little beyond the blade, reaches almost to the tip of the carpocerite.

Outer margin of the antepenultimate joint of external maxillipeds ending in a spiniform tooth; penultimate joint quadrate, as long as broad; terminal joint 3-times as long as the penultimate and 3-times as long as broad at its base, narrowing towards the distal extremity, that bears some setae twice as long as the joint itself.

Merus of the large cheliped of the male 3,5-times as long as broad, upper margin unarmed at apex, infero-external margin finely serrulate, infero-internal with 4 aciculiform spinelets and ending in a small acute tooth. Chela obliquely turned outward, one and a half as long as the carapace (rostrum included) and about 3-times as long as high, the palm presenting its greatest height (or breadth) at one-fourth from the carpal articulation. The palm, distinctly compressed, being half as thick as high, narrows toward the articulation of the fingers, that are almost half as long as the palm; upper border of the palm entire, without a transverse groove, appearing finely granular under a lens until near the articulation of the fingers that are smooth. Both the upper and the lower border are fringed with hairs at the inner side, like in other species. Dactylus a little longer than the immobile finger.

In the female specimens the large cheliped is missing. Of the small cheliped of the male the merus is 4-times as long as broad, upper margin unarmed at the apex, infero-external margin serrulate, infero-internal with 5 aciculiform spinelets, the extremity unarmed. Chela a little shorter than the larger, one-fourth longer than the carapace; palm as long as the fingers, almost 3-times as long as high, somewhat compressed, very slightly granular, upper border without a transverse groove. Fingers slender, dactylus *Balaeniceps*-shaped. In an egg-bearing female from Stat. 114 the merus of the small cheliped is almost 5-times as long as broad, for the rest it agrees with that of the male, but it presents a small acute tooth at the far end of the infero-internal margin. Chela shorter than the small chela of the male, as long as the carapace without the rostrum; fingers slender, tapering, shutting together when closed, a little (one-seventh) longer than the palm, which is 3-times as long as high and somewhat compressed. Like in the male, both margins of the chela are fringed with hairs at the inner side. In the adult male from Stat. 114 the carpal segments of the 2nd legs are 0,9 mm., 1,26 mm., 0,45 mm., 0,46 mm. and 0,44 mm. long; the 2nd segment is 9-times as long as thick and the chela is 0,8 mm. long (palm 0,3 mm., fingers 0,5 mm.). In an egg-bearing female from the same station the carpal segments are 0,94 mm., 1,22 mm., 0,48 mm., 0,48 mm. and 0,46 mm. long, while the 2nd segment is also 9-times as long as thick; chela 0,78 mm. long (palm 0,3 mm., fingers 0,48 mm.). These numbers prove that the 2nd segment is one-third longer than the 1st, that the three last segments are equal, half as long as the first, that the chela is a little shorter than the 1st segment, that the fingers are one and a half as long as the palm and that the carpus has a very slender form, the 2nd segment being 9-times as long as thick. It is from the slender form of the carpus that the specific name is derived.

Ischium of 3rd and 4th legs with a movable spine. Merus of 3rd legs unarmed, slender, 8-times as long as broad; carpus half as long as the preceding joint, propodus little longer than the carpus (proportion 1,2), very slightly curved and somewhat narrowing towards the distal extremity; both margins of the propodus which is 9-times as long as broad in the middle, are beset with long setae while one observes 5 or 6 spinules along the posterior margin. Dactylus lanceolate, slightly arcuate, about half as long as the propodus, decidedly broader in the middle than high.

Merus of 4th legs one-fourth shorter than that of the 3rd pair.

† 35. *Alpheus* sp.

Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 54—90 m. Fine grey sand, coarse sand with shells and stones. 1 specimen.

This specimen, perhaps a male, long 16 mm., appears closely related to *A. tenuicarpus* de Man, but I wish to describe it separately, because it shows some differences.

The acute rostrum that reaches to the middle of the visible part of 1st antennular article, appears at its base slightly broader than it is long and the concavities at either side are shallow, not so deep as in *A. tenuicarpus* and *A. paralpheopsides*. Rostral carina as in *A. tenuicarpus*, telson also, but the spinules of the upper surface are a little farther distant from the lateral margins.

First antennular article a little shorter than in *A. tenuicarpus*, distinctly shorter than the 2nd, which, like in this species, is twice as long as thick and one and a half as long as the 3rd. Stylocerite, carpocerite and scaphocerite as in *A. tenuicarpus*.

Merus of the large cheliped 4-times as long as broad, upper margin unarmed at apex, infero-external margin serrulate, infero-internal margin with 2 aciculiform spinelets and ending in an acute tooth. Chela 6,6 mm. long, about one-fourth longer than the carapace, its form more slender than that of *A. tenuicarpus*, because it is 4-times as long as high; it narrows also in a less degree than in this species, with which it agrees for the rest, the palm being 4,6 mm. long, a little more than twice as long as the fingers.

Unfortunately the smaller cheliped is missing.

Carpal segments of 2nd legs 1 mm., 1,22 mm., 0,44 mm., 0,44 mm. and 0,48 mm. long, chela 0,85 mm. long (palm 0,36 mm., fingers 0,49 mm.), while the 2nd segment is 8-times as long as thick: these numbers prove that the carpus also much resembles that of *A. tenuicarpus*. Legs of the 3rd and 4th pair similar to those of this species. Ischium with a movable spine. Merus of 3rd legs unarmed, 7-times as long as broad; propodus as in *A. tenuicarpus*, but 1,4-times as long as the carpus; dactylus two-thirds of the propodus.

† 36. *Alpheus tenuipes* de Man.

J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1910, p. 288.

Stat. 204. September 20. 4° 20′ S., 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. From 75—94 m. Sand with dead shells. 2 specimens, one of which with eggs.

A new species of the *Insignis* subgroup, closely related to *A. paracrinitus* Miers and to its variety *bengalensis* Cout. (Confer: H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 901, Pl. LXXXII, Figs. 37, 38).

Rostrum triangular, acute, as long as wide at its base, a little shorter than half the visible part of basal antennular article; rostral carina obtuse, short, reaching only to the posterior end of the corneae and separated by feeble depressions from the orbital hoods that are rounded and unarmed. Frontal margin almost transverse, orbits not prominent, the frontal margin

appearing only slightly concave at either side of the rostrum. The orbits are quite open anteriorly and the eyes that reach with their corneae to the anterior margin of the orbits, are perfectly visible from before; as in *A. alpheopsides*, the rostrum is not thickened inferiorly, but one observes a narrow tooth that arises from between the eyes but that does not extend upward as far as the rostrum. Pterygostomian angle obtuse.

The telson is much more narrowed backward than that of *A. paracrinitus* or *A. alpheopsides* and much resembles that of *A. paralpheopsides* Cout., as is proved by the Table of measurements, but, while in *A. paralpheopsides* the telson is 4-times as long as the posterior margin is broad, it is almost 5-times in *A. tenuipes*. Spinules of the upper surface 0,14 mm. long, situated as in *A. paralpheopsides*.

In the larger specimen that unfortunately has lost all its legs, the antennular peduncle is 5-times as long as thick in the middle; the 2nd article, twice as long as thick, appears one-fourth longer than the visible part of the 1st, while the 3rd or distal article appears a little more than half as long as the 2nd and one-fifth shorter than the visible part of the 1st. The other specimen only differs by the median article being about as long, but not longer than the visible part of the 1st. Stylocerite pointed, as long as basal antennular article.

Basicerite with a very small spinule at the lower side. Carpocerite 4,2—4,4-times as long as thick, reaching beyond the tip of the antennular peduncle by half the 3rd article. Scaphocerite as in *A. paracrinitus* var. *bengalensis*, but shorter, the blade reaching in the larger specimen to the middle of 3rd antennular article, while the terminal spine which is slightly curved inward, hardly extends beyond the blade; in the egg-bearing female the blade hardly reaches beyond the median article, but the terminal spine is a little longer, reaching almost to the middle of 3rd article.

Ischium of the large cheliped of the egg-bearing female unarmed. Merus slender, 5-times as long as broad; upper margin unarmed at the apex, infero-internal margin with 4 small, movable spinules that slightly increase in length from the 1st or proximal to the 4th and with a somewhat larger, immovable spine near the extremity. The large chela, which is as long as the carapace, viz. 4,42 mm., is just 4-times as long as high in the plane of the fingers and appears therefore a little more slender than that of *A. paracrinitus* var. *bengalensis* (Coutière, l. c. Fig. 37*a*), with which it for the rest fully agrees, the palm being nearly cylindrical, unarmed and without a transverse groove. Merus of the small cheliped 6-times as long as broad, with 2 very small, movable spinules and with a somewhat larger, immovable tooth near the apex. The small chela resembles that of *A. paracrinitus* var. *bengalensis*; it is but a little more than half as long as the larger, the proportion being as 1 : 1, 67; the fingers are one-fifth longer than the palm, which is about 3-times as long as high and unarmed near the articulation of the fingers.

The 2nd and the 4th legs are missing in this female. The legs of the 3rd pair resemble those of the quoted species, but they are still more slender. The relative dimensions are: merus 1,8; carpus 1; propodus 1,44. Ischium with a strong movable spine near the base. Merus 8,5-times as long as broad, carpus 6,4-times as long as thick at the distal extremity; propodus 12-times as long as broad, with 4 or 5 spinules on the posterior margin and slightly

setose; dactylus slender, 8-times as long as thick, half as long as the carpus and measuring almost two-fifths of the propodus.

Ischium of 5th legs unarmed. Merus, carpus and propodus of subequal length, the carpus as much shorter than the merus as the latter is shorter than the propodus, the propodus being about one-tenth longer than the carpus; dactylus measuring a little more than one-third of the propodus.

Table of measurements.

	N° 1.	N° 2.
Proportion between length of telson and width of the posterior margin	4,8	4,75
Proportion between the width at the base and that of the posterior margin.	2,6	2,5
Proportion between length of telson and the distance of the anterior pair of spinules from the posterior margin	1,9	1,9
Proportion between the distances of both pairs from the posterior margin	1,6	1,8

N° 1 the larger specimen long 13 mm.; N° 2 the female long 11,5 mm.

IV. *Brevirostris* group.

37. *Alpheus rapax* Fabr.

Alpheus rapax J. C. Fabricius, Supplementum Entomologiae Systematicae, 1798, p. 405.
Alpheus malabaricus F. Hilgendorf, in: Monatsb. Kgl. Akad. Wiss. Berlin, 1878, p. 832.
Alpheus brevirostris J. G. de Man, in: Journal Linnean Society, London, Vol. XXII, 1888, p. 261,
Alpheus rapax H. Coutière, Les "Alpheidae", Morphologie externe et interne etc., Paris, 1899, p. 233, fig. 284.
Alpheus rapax J. G. de Man, in: Mémoires Soc. Zoolog. France, 1909, p. 147, Pl. VII, figs. 1—8.

Stat. 234. November 19/20. Nalahia-bay, Nusa-Laut-island. 46 m. Bottom stony. 2 adult specimens, one of which is egg-bearing.

These two specimens have been fully described by me in a paper published in 1909 (l. c.) on some species of the genus *Alpheus* appertaining to the *Brevirostris* group, in which paper also the differences have been pointed out existing between *A. rapax* on one side and *A. brevicristatus* de Haan, *A. brevirostris* (Oliv.) and *A. distinguendus* de Man on the other.

General distribution: Zanzibar (Hilgendorf); Djibouti (Coutière); Mergui Archipelago (de Man).

†38. *Alpheus brevirostris* (Oliv.) var. *angustodigitus* n.

Confer: H. Milne-Edwards, Hist. Nat. Crust. II, 1837, p. 350 and J. G. de Man, in: Mém. Soc. Zoolog. de France, 1909, p. 153—160 (passim in texto).

Balikpapan, east coast of Borneo. 1 adult male and 1 adult, egg-bearing female collected by Mr. J. W. Tissot van Patot and preserved in the Zoological Museum of the University of Amsterdam.

Whereas the male is not injured at all, the female has lost all its legs excepting one of the 2nd pair. In the cited paper several observations regarding *A. brevirostris* (Oliv.) were published by me on Olivier's type specimen from New Holland, which courteously had been

entrusted to me by Professor COUTIÈRE of Paris. The two specimens from Balikpapan differ from the type species 1° by the broader telson, 2° by the carpocerite being just as long as the antennular peduncle, 3° by the more narrow shape of the dactylus of the small chela of the male and 4° by the carpus of the 2nd legs presenting a somewhat less slender form and the 2nd segment being distinctly shorter than the 1st. These specimens are therefore described as a variety of *A. brevirostris*, but they will perhaps prove to be specifically distinct, when we one day will be able to compare this variety carefully with specimens of the typical species. The typical *A. brevirostris* from New Holland is, indeed, as far as I am aware, only known by the descriptions of OLIVIER and H. MILNE-EDWARDS and by observations of COUTIÈRE and myself, all derived from OLIVIER's type, for this rare species has seemingly not yet been found back since it was described in the Encyclopaedie Méthodique.

The male is 45 mm. long, the female 62 mm. While in the female the rostrum reaches just to the middle of the visible part of basal antennular article, it surpasses in the male very slightly the middle; the rostral carina, which is strongly compressed and acute and separated from the eye-hoods by rather broad and deep grooves, is traceable to the middle of the carapace, more distinctly in the larger specimen, the female, than in the other.

As results from the Table, the telson appears a little broader with regard to its length than in *A. brevirostris*, but the telson of the male does not fully resemble that of the female. In the female the posterior margin appears a little wider in proportion to the length of the telson than in the male and in the male the posterior pair of spinules on the upper surface are situated nearer to the anterior pair than in the female.

The inner antennae agree with those of the typical species and, both in the male and in the female, the terminal spinule of the stylocerite is distinctly directed outward. In both specimens the basicerite is armed with a small spinule at the lower side; the carpocerite, both in the male and in the female just as long as the antennular peduncle, extends in the male to the distal 3rd or 4th part of the terminal joint of the external maxillipeds, in the female, however, just as far as in the typical species, namely to the middle of the joint; the scaphocerite presents the same form and the same length as in the typical species.

In the male the right cheliped is the larger. In both chelipeds the upper margin of the merus ends in a small, acute spine; in both legs one observes a small spinule near the proximal extremity of the infero-internal margin, another similar spinule in the middle and a somewhat larger, though also rather small spine near the distal extremity. The large chela is 21,5 mm. long and 8 mm. high, while the fingers are 8,25 mm. long; height of the palm at the articulation of the dactylus 7 mm. The transverse groove behind the articulation of the dactylus is well-developed; granulation of the palm rather fine, outer surface of the fingers almost smooth.

Of the typical *A. brevirostris* the small chela of the male has been figured by COUTIÈRE in his important work: Les "Alphéidae", Paris, 1899, p. 230, Fig. 282, while I have figured the dactylus (l. c. Fig. 16). The small chela of the male from Balikpapan, however, closely resembles that of the male of *A. distinguendus* de Man, a japanese species which DE HAAN has described under the name of *A. rapax* (J. G. de Man, l. c. Fig. 9); in the male from

Balikpapan this chela is 16,5 mm. long, the palm is 5,25 mm. long and 4,5 mm. high at the articulation of the fingers, so that it appears slightly longer than high. The fingers that leave a hiatus between them when closed and that are excavate at the inner side, are thickly beset with hairs on their prehensile edges and on the inner side; they are twice as long as the palm. The dactylus, 2 mm. high at the outer side, appears, as in *A. distinguendus,* nearly 5-times as long as high and not 4-times as in the typical *brevirostris;* the lower margin appears therefore also less strongly undulate than in the latter species. The outer and the inner side of the dactylus are finely granulate and the granulation extends on the base of the immobile finger, but for the rest this finger and the dactylus are smooth.

In both legs of the 2nd pair of the male the merus is 7,7-times longer than wide; in the female the merus is injured. Of the left leg of the male the carpal segments are 3,7 mm., 3,4 mm., 1,3 mm., 1,14 mm. and 1,5 mm. long, the chela 2,8 mm. long (palm 1,28 mm., fingers 1,52 mm.); in the right leg these numbers are, for the carpus: 3,7 mm., 3,5 mm., 1,3 mm., 1,14 mm. and 1,6 mm., for the chela 2,8 mm. (palm 1,2 mm., fingers 1,6 mm.). In the female the carpal segments are 4,4 mm., 3,7 mm., 1,8 mm., 1,64 mm. and 2 mm. long, the chela 3,3 mm. (palm 1,5 mm., fingers 1,8 mm.). In both legs of the male the 1st segment is 5,6-times, the 2nd 5,6 to 5,8-times as long as thick at the distal extremity, in the female the 1st segment 5,5-times, the 2nd almost 5-times. Differently from the typical species the 2nd segment appears a little shorter than the 1st and the carpus shows also a less slender form, for in the New Holland species the 2nd segment is described as being about 7-times as long as wide (J. G. DE MAN, l. c. p. 156). The 4th segment appears constantly a little shorter than the 3rd and the 3rd a little shorter than the 5th; the fingers are slightly longer than the palm.

Merus of 3rd legs in the male 4,5-times longer than wide.

Table of measurements in millimeters.

	N° 1. ♂	N° 2. ♀	N° 3. ♂
Length of the telson.	6	7,75	6,8
Width at the base	3,5	4,7	3,5
Width of the posterior margin	2,2	3,25	
Proportion between the length of the telson and the width at the base	1,7	1,65	1,94
Proportion between the length of the telson and the width of the posterior margin .	2,72	2,38	
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,7	1,65	
Proportion between the distances of both pairs of spinules from the posterior margin.	1,27	1,57	

N° 1 and N° 2 Balikpapan; N° 3 type of *A. brevirostris* (Oliv.) from the Paris Museum.

†39. *Alpheus barbatus* Cout.

Alpheus barbatus H. Coutière, in: Bull. Mus. Paris, 1897, N° 6, p. 235 and in: Les "Alphéidae", Morphologie externe et interne etc. Paris, 1899, p. 230, figs. 279, 280 and in: Alpheidae Mald. and Laccad. Archip. 1905, p. 906.

Stat. 34. March 27. Anchorage off Labuan Pandan, Lombok. Coralreef. 1 young specimen.
Stat. 142. August 5/7. Anchorage off Laiwui, coast of Obi Major. Reef. 1 young specimen.

Stat. 311. February 12/13. Sapeh-bay, East coast of Sumbawa. Reef. 1 specimen of medium size, probably a male.

It is rather incomprehensible that COUTIÈRE in his diagnosis, in which he only deals with the shape of the two chelae of the 1st pair of legs and with the coloration, does represent this species as related to *A. socialis* Heller from New Zealand, the characters of which are quite different and to which *A. barbatus* resembles not at all. I am very much obliged to Professor COUTIÈRE for having enabled me to examine the type specimens of *A. barbatus*, collected by him at Djibouti, (two specimens without the legs, four larger chelipeds, one small cheliped of a male and one of a female, and legs of the following pairs). The examination of these specimens proved that *A. barbatus* is not only characterized by the shape of the first pair of legs, but also by that of the following and by the features of the rostrum and of the two pairs of antennae.

Unfortunately no adult or egg-bearing specimens were collected by the "Siboga" and in all the specimens collected the smaller cheliped is missing.

The larger of the two type specimens from Djibouti, an ova-bearing female, is 22,5 mm. long, while the largest specimen captured by the "Siboga", that from Stat. 311, is 15,5 mm. long. It is from this specimen that the following description is taken.

Width of the orbital region two-thirds that of the anterior margin of the carapace. Rostrum short, obtuse, hardly reaching beyond the middle of the visible part of 1st antennular article, twice as broad at its base as it is long. Anterior margin of the orbital hoods rounded, unarmed. Interorbital carina obtuse, separated by moderately broad and shallow grooves from the orbits, beyond the base of which it does not extend.

Abdominal pleura rounded inferiorly. Greatest width of the telson slightly more than half its length, distance between the postero-lateral angles just half as broad as the greatest width. The two pairs of spinules on the upper surface are very small, the anterior pair one and a half as far distant from the base of the telson as from its posterior margin; subterminal spines also very small.

Second antennular article almost as thick as long and one and a half as long as the visible part of the first; 3rd article as long as the 2nd. Stylocerite rounded, as long as 1st article.

Basicerite unarmed, carpocerite stout, considerably longer than the antennular peduncle, extending beyond the tip by somewhat more than the length of 3rd article; scaphocerite 2,5-times as long as broad, narrowing anteriorly, the terminal spine extends by one-fourth of its length beyond the blade and the outer margin is straight. The scaphocerite, much shorter than the carpocerite, is but little longer than the antennular peduncle, the blade reaching to the end of the peduncle.

In the adult type specimen from Djibouti the 2nd antennular article appears almost one and a half as long as thick, whereas the 3rd article appears decidedly somewhat shorter.

In the specimen from Stat. 311 the terminal joint of the external maxillipeds bears several strong setae at the truncate extremity. Merus of the large cheliped half as broad as long, infero-internal margin somewhat uneven, unarmed at the apex like also the upper margin,

infero-external margin entire, not serrulate. (In two younger type specimens the infero-internal margin carries 3 small spinelets). Larger chela twice as long as broad, in adult type specimens two and a half times; the chela agrees with Fig. 279 of COUTIÈRE's work of 1899, but the lower margin runs distally a little upward and is not concave at the base of the immobile finger.

In the right leg of the 2nd pair the carpal segments are 1 mm., 0,6 mm., 0,32 mm., 0,34 mm. and 0,54 mm. long, while the second segment is little more than twice as long as thick; chela 1,08 mm. long (palm 0,56 mm., fingers 0,52 mm.). The left leg agrees with the right except the fifth segment of the carpus that is as long as the second. (In one of the adult type specimens from Djibouti the carpal segments are 1,3 mm., 0,8 mm., 0,32 mm., 0,34 mm. and 0,68 mm. long, the second segment 0,35 mm. thick; chela 1,28 mm. long (palm 0,55 mm., fingers 0,73 mm.)). These numbers show that the carpus has a stout form, that the second segment is little more than half as long as the first, that the fifth is usually a little shorter than the second and that the fingers are in the adult distinctly longer than the palm, in younger specimens slightly shorter than it, whereas the chela is as long as the first segment.

Ischium of the three following legs armed with a small movable spine. Merus of 3rd pair little more than 3-times as long as broad, unarmed; carpus 2,5-times as long as thick; propodus one-third longer than the carpus, little more than 3-times as long as broad, straight, slightly narrowing distally, with the posterior margin bearing 4 spines besides 2 at the distal extremity; dactylus half as long as the propodus, simple.

Remarks. *Alpheus socialis* Heller differs 1° by the triangular, otherwise shaped rostrum, 2° by the orbits that are armed with a spine, 3° by the second antennular article being twice as long as the first, 4° by the spine on the basicerite being long, 5° by the upper border of the larger chela being entire, 6° by the dactyli of the posterior legs presenting an accessory claw, etc.

General distribution: Djibouti (COUTIÈRE); Mascate (COUTIÈRE).

† 40. *Alpheus pubescens* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1898, p. 109.

Stat. 43. April 4/5. Anchorage off Pulu Sarassa, Postillon-islands. Depth up to 30 m. Coral. 1 young specimen.
Stat. 60. April 27/28. Haingsisi, Samau-island. Timor. Lithothamnion in 3 m. and less. 1 male of medium size and 1 younger specimen.
Stat. 71. May 10—June 7. Makassar. Depth up to 32 m. Mud, sand with mud, coral. 1 egg-bearing female.
Stat. 77. June 10. 3° 27′ S., 117° 36′ E. Borneo-bank. 59 m. Fine, grey coralsand. 1 female without eggs.
Stat. 162. August 18. Between Loslos and Broken-islands, West coast of Salawatti. 18 m. Coarse and fine sand, with clay and shells. 1 adult, mutilated female.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 adult male and 1 ova-bearing female.

A new species of small size of the *Brevirostris* group. The adult male from the Aru-islands is 20,5 mm. long, the egg-bearing female from Makassar 18 mm.: these two will be described as the types of this species.

Rostrum acute, pointed, narrow, reaching to the middle or just beyond the middle of the visible part of 1st antennular article, separated by a concave emargination from the rounded, unarmed, anterior border of the orbits. Width of the orbital region two-thirds that of the anterior margin of the carapace. Rostral carina continued to the middle of the carapace, interorbital part slightly concave, concealed in a lateral view by the orbits and presenting a prominence just behind the base of the orbital hoods, which prominence is, however, so small that it may easily be overlooked; it is twice as far distant from the posterior margin of the carapace as from the tip of the rostrum, the extremity of which is curved downward. In the male from Stat. 273 the rostral carina appears rather obtuse, in the adult females somewhat sharper; in the young female from Stat. 77 it is rather obtuse posteriorly to the corneae and the small prominence is inconspicuous. The interorbital part is separated from the orbits by narrow, moderately deep grooves.

This species is easily recognizable by the fine pubescence of the carapace, which is rather thickly covered with short hairs, 0,06—0,1 mm. long; orbital hoods nearly glabrous. Abdomen smooth and glabrous, pleura rounded below. Telson of the male not yet twice as long (3 mm.) as broad anteriorly (1,64 mm.), distance (1,08 mm.) between the postero-lateral angles two-thirds the greatest width; spinules of the upper surface large, anterior pair a little farther distant from the posterior margin than from the base, upper surface faintly furrowed longitudinally on its anterior half.

Second article of the pubescent antennular peduncle in the male half as thick as long, little — in the adult one-sixth, in younger specimens one-fourth or one-third — longer than the visible part of the first, third article three-fifths of the second; in the egg-bearing female from Makassar the width of the second article is little more than one-third of its length and this article is one-fourth longer than the visible part of the first. Stylocerite terminating in a spine that reaches to the end of first article.

Spine of the basicerite small, shorter than the stylocerite. Carpocerite as long as the scaphocerite, extending beyond the antennular peduncle by two-thirds of the 3rd article. The scaphocerite, the greatest width of which is one-third of its length, is fringed with long setae and gradually narrows distally; the outer margin is concave and the terminal spine, almost half as long as the scaphocerite, exceeds the tip of the blade by one-fifth of its length, the point being curved inward.

External maxillipeds reaching as far forward as the antennal peduncles, penultimate joint one and a half as long as thick, terminal joint twice as long as the penultimate and 4-times as long as broad, in a lateral view; the truncate extremity bears a tuft of setae, that are twice as long as the joint itself.

Merus both of the larger and of the smaller cheliped of the male 2,5-times as long as broad, upper margin unarmed at apex, infero-internal margin armed with 4 or 5, short, movable, spinules and, at the far end, with an acute tooth. Carpus with a small, acute tooth at the infero-internal angle. Large chela one-third longer than the carapace, resembling that of *A. Miersi*, high, the proportion between length and height being 2,4; fingers little shorter than the palm, the latter 1,3-times as long as the former. The upper border of the palm which

is much compressed, its thickness being in proportion to its height as 2 : 5, bears a transverse groove just behind the articulation of the dactylus and appears, posteriorly to this groove, flattened; the outer margin of the upper border is marked with a ridge, the inner is fringed with hairs. The somewhat pubescent, outer surface of the palm is flattened, that of the immobile finger slightly concave and the outer margin of the lower border, which appears concave at the base of the immobile finger, is rather sharp. Inner face of the palm, especially of the immobile finger, finely granular.

Merus of the large cheliped of the adult female less broad than that of the male, 3,5-times as long as broad, infero-external margin feebly serrulate, infero-internal with 5 short spinules and, at the apex, with a sharp tooth, like in the male; chela as long as the carapace, comparatively less high than in the male, the proportion between length and height being 3,3; fingers shorter than in the male, the palm 1,5-times as long as the fingers. There is a transverse groove on the upper border, which is less distinctly flattened.

Small chela of the male hardly longer than the carapace, much resembling that of *A. djeddensis* Cout. (COUTIÈRE, Les "Alpheidae", Paris, 1899, p. 233, fig. 285); the fingers that are *Balaeniceps*-shaped, agree with those of this species, but they are slightly longer than the palm, the upper border of which is flattened, with a transverse groove near the dactylus and with the outer margin ridged; this chela is 3,45-times as long as high. Merus of the small cheliped of the female similar to that of the larger, but 4-times as long as broad. Chela a little shorter than the carapace, 5,6-times as long as high, presenting its greatest height at the articulation of the fingers; fingers one and a half as long as the palm, slender, shutting together, their tips crossing one another; upper border of the palm which is slightly higher than thick, without a transverse groove. In the adult male the carpal segments of the 2nd legs are 1,35 mm., 1,95 mm., 0,8 mm., 0,75 mm. and 0,8 mm. long, the second segment 8-times as long as thick; chela 1,14 mm. long (palm 0,56 mm., fingers 0,58 mm.). In the somewhat younger male from Stat. 60 these segments are 0,9 mm., 1,75 mm., 0,84 mm., 0,8 mm. and 0,7 mm. long, the second segment 9-times as long as thick; chela 1 mm. long (palm 0,46 mm., fingers 0,54 mm.). In the egg-bearing female from Makassar the carpal segments are 1,4 mm., 1,44 mm., 0,6 mm., 0,6 mm. and 0,6 mm. long, the second 7-times as long as thick; chela 1,04 mm. long (palm 0,44 mm., fingers 0,6 mm.). In the female from Stat. 77, finally, the segments of the carpus are: 1 mm., 1,54 mm., 0,7 mm., 0,66 mm. and 0,68 mm. long, the second segment 7,7-times as long as thick; chela 1,05 mm. long (palm 0,45 mm., fingers 0,6 mm.). These numbers prove that the second segment of the slender carpus appears in the male and in the young female one and a half to twice as long as the first, while both segments are nearly of equal length in the adult female (in the egg-bearing female from Stat. 162 the second segment is also but $^1/_{12}$ longer than the first), and that the three, slender, last joints are of equal length.

Ischium of 3rd and 4th legs with a movable spine. Merus of the 3rd legs, in the adult male, slender, 5-times as long as broad, unarmed. Carpus half as long as the merus, propodus 1,3-times as long as the carpus, straight, slightly narrowing towards the distal extremity, 5-times as long as broad near the carpal articulation; posterior margin of the propodus with 5 pairs of spinules, both margins beset with long setae, like the anterior border of the carpus. Dactylus

half as long as the propodus, one-third the length of the merus, not broader than thick, slightly curved, not flattened, simple.

Remarks. *Alpheus djeddensis* Cout. from the Red Sea is a closely related form, in which the carapace is also pubescent. It is a species of much larger size, of which I have treated in: Mémoires Soc. Zoolog. France, 1909, p. 160—163, Pl. VIII, figs. 25, 26.

†41. *Alpheus savuensis* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 110.

Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. Depth 27 m. and less. Coral and coralsand. 1 egg-bearing female.
Stat. 58. April 25. Anchorage off Sebu, Savu. Reef. 1 male.

Another new species of small size of the *Brevirostris* group, closely related to *A. pubescens* de Man. Male 18,5 mm. long, the female 17 mm. Carapace almost quite glabrous. Rostrum acute, in the male just as long as broad at its base, in the female a little longer than broad, extending in the male to the middle, in the female just beyond the middle of the visible part of 1st antennular article, projecting with four-fifths of its length beyond the rounded, anterior margin of the slightly prominent, unarmed, orbital hoods; width of the orbital region two-thirds that of the anterior margin of the carapace. The rostral carina, which in the male is continued, though inconspicuously, for a short distance beyond the base of the orbital hoods, in the female not, appears rather sharp between the orbits, from which it is separated by deep and broad grooves; the interorbital part of the carina is concealed, in a lateral view, by the orbital hoods and appears nearly straight, while the rostrum projects straightly forward. Second antennular article in the male twice, in the female a little more than twice as long as thick (proportion in the female 2,25), a little — in the male one-fourth or one-fifth, in the female one-third — longer than the visible part of first article, third article a little shorter than that visible part. Acute point of stylocerite curved inward, not spiniform as is the case in most other species of this group and extending to the distal sixth of the visible part of first article. Spine on the basicerite small, shorter than the stylocerite. Carpocerite projecting for a short distance — one-third of the 3rd article — beyond the antennular peduncle; scaphocerite as long as the carpocerite, not longer, resembling that of *A. pubescens*, its greatest width two-fifths of its length, outer margin concave, terminal spine and blade also as in that species.

External maxillipeds reaching as far forward as the antennular peduncle; penultimate joint almost as thick as long; terminal joint 2,5-times as long as the penultimate and, in a lateral view, 3,5-times as long as broad, terminal setae twice as long as this joint.

Merus of the large cheliped of the male (in the female both legs of the 1st pair are missing) 2,5-times as long as broad, upper margin unarmed at the apex, infero-external feebly serrulate, infero-internal with a small, acute tooth at the far end, preceded by one or more short spinules (the margin presents a few obtuse prominences, one of which is tipped with a very small spinule, on the other ones the spinule is apparently lost). A small acute tooth at the infero-internal angle of the carpus. Chela similar to that of *A. pubescens*, high, 2,55-times as long as high

(or broad), palm one and a half as long as the fingers; palm compressed, upper border with a transverse groove near the dactylus, posterior to the groove the upper border is flattened until to the oval area, its outer margin, however, is not ridged; outer face of the palm smooth, glabrous, slightly concave on the immobile finger, inner face finely granular, like the lower border, the outer margin of which is rounded. Upper and lower border of the chela fringed with hair at the inner side, fingers smooth, except the inner face of the immobile finger, which is finely granular.

Merus of the small cheliped of the male 2,3-times as long as broad, of a stouter form than that of *A. pubescens*, for the rest agreeing with the merus of the large cheliped. Chela 5,3 mm. long, much shorter than the carapace (6,5 mm.), of a stouter shape than that of *A. pubescens*: the chela, indeed, is only 3-times as long as high and the fingers are a little longer than the palm; palm distinctly compressed, flattened above, without a transverse groove near the dactylus, inner face flattened, finely granular, fringed with hairs at the upper and at the lower margin, outer face also somewhat granular. Fingers *Balaeniceps*-shaped, as in *A. djeddensis* Cout. and *A. pubescens*; dactylus ridged above and fringed with hair at the inner side of this ridge, nearly as in these species. Carpal segments of second legs in the male: 1 mm., 1,5 mm., 0,6 mm., 0,6 mm. and 0,62 mm. long, chela 0,9 mm. long (palm 0,4 mm., fingers 0,5 mm.); in the female these segments measure 0,9 mm., 1,25 mm., 0,54 mm., 0,5 mm. and 0,58 mm., chela 0,85 mm. (palm 0,42 mm., fingers 0,43 mm.), and, both in the male and in the female, the second carpal segment is 7-times as long as thick. These numbers prove that the carpus much resembles that of *A. pubescens*, the second segment being 7-times as long as thick, in the male one and a half, in the female almost one and a half as long as the first, while the three last segments are of subequal length.

Ischium of the three posterior legs with a movable spine. Merus of 3rd legs of a stouter shape than that of *A. pubescens*, being only four times as long as broad, unarmed; carpus unarmed, a little more than half as long as the merus, propodus 1,2-times as long as the carpus, straight, slightly narrowing towards the distal extremity, 4-times as long as broad near the carpal articulation; posterior margin with 5 pairs of spinules, both margins with long setae, like the anterior border of the carpus. Dactylus half as long as the propodus, one-third the length of the merus, slightly curved, styliform like that of *A. pubescens*, not broader than thick, not flattened, simple. Ova not very numerous, 0,65 mm. long, 0,5 mm. thick.

42. *Alpheus Miersi* Cout.

Alpheus rapax var. *Miersi* H. Coutière, in: Bull. Soc. Entom. France, 1898, p. 166.
Alpheus Miersi H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 903, Pl. LXXXIII, Pl. LXXXIV, fig. 42.
Alpheus miersi J. Pearson, On the Macrura, in: Report Pearl Oyster Fisheries Ceylon, 1905, p. 85.

Stat. 37. March 30/31. Sailus ketjil, Paternoster-islands. 27 m. and less. Coral and coralsand. 1 adult egg-bearing female and 1 young specimen.
Stat. 66. May 7/8. Bank between islands of Bahuluwang and Tambolungan, South of Saleyer. 8 m. Dead coral, Halimeda, Lithothamnion. 1 young specimen, probably a male.

Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion. 4 females, the largest of which is egg-bearing, all taken on the surface.
Stat. 240. November 22 till December 1. Banda-anchorage. Black sand, coral, Lithothamnion-bank in 18—36 m. 1 young female.

The largest of the specimens is the adult female from Stat. 37, which is 21 mm. long. The stylocerite reaches to the end, the rostrum almost to the end of first antennular article. The fingers of the large chela appear a little shorter than in COUTIÈRE's figure 42*c*, the palm being almost twice as long as the fingers. There is a small acute tooth at the far end of the infero-internal margin of the merus of the small cheliped, this tooth is much smaller than the corresponding tooth on the merus of the larger leg; in both chelipeds the infero-internal margin bears 3 small spinules on its proximal half. The carpal segments of the right leg of the second pair are 1,4 mm., 1,28 mm., 0,58 mm., 0,6 mm. and 0,72 mm. long; the chela is 1,25 mm. long (palm 0,54 mm., fingers 0,71 mm.); the left leg is missing. In the right leg the first segment appears slightly longer than the second and the third and fourth are almost of the same length.

Merus of third legs almost 5-times as long (2,9 mm.) as broad (0,66 mm.) with a rather small, acute tooth at the far end of the posterior margin; propodus but little longer than the carpus (proportion 1,18), about as in COUTIÈRE's figure 42*g*, while according to the description the propodus should be almost one and a half as long as the carpus (proportion 1,43).

The egg-bearing female from Stat. 99 is only 15,5 mm. long. In this specimen the 3rd antennular article appears a little shorter than the visible part of the 1st. Meri of chelipeds with 4 spinules besides the apical tooth on their infero-internal margin. In the right leg of the second pair the carpal segments are 1,12 mm., 1,12 mm., 0,5 mm., 0,56 mm. and 0,74 mm. long; the chela is 1,05 mm. long (palm 0,46 mm., fingers 0,59 mm.). In this specimen the first segment appears just as long as the second, but in another from the same locality the second segment appears slightly longer than the first, the segments being 1 mm., 1,05 mm., 0,5 mm., 0,52 mm. and 0,6 mm. long.

In the third specimen long 9 mm. from Stat. 99 the carpal segments of the right leg measure 0,68 mm., 0,7 mm., 0,34 mm., 0,34 mm. and 0,42 mm.; the chela is 0,66 mm. long (palm 0,31 mm., fingers 0,35 mm.). In this specimen the propodus of the third legs, that carries 6 spines on the posterior margin, appears comparatively longer than in the preceding specimen, for it is almost 1,4-times as long as the carpus. In the specimen from Stat. 66, finally, the second segment of the carpus appears distinctly longer than the first, while the three following are equal.

General distribution: Maldive and Laccadive Archipelagoes (COUTIÈRE); Ceylon (COUTIÈRE); Gulf of Manár, Cheval Paar, off Mutwal Island (PEARSON); Mascate (COUTIÈRE); Port-Molle (COUTIÈRE); New Caledonia (COUTIÈRE); Japan (COUTIÈRE).

†43. *Alpheus rapacida* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 105.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. 36 m. Mud and hard sand. 1 young female.

Stat. 279. January 11/13. Rumah-Kuda-bay, Roma-island. 36 m. Mud and sand. 1 specimen, probably a male, and 1 egg-bearing female.

Stat. 313. February 14/16. Anchorage East of Dangar Besar, Saleh-bay. Depth up to 36 m. Sand, coral and mud. 2 specimens, one of which with eggs.

Probably a new species, closely related to *A. rapax* de Haan = *A. distinguendus* de Man from Japan and to *A. rapax* Cout. 1905 from the Laccadive Archipelago. It belongs to those species of the *Brevirostris* group, in which the upper border of the large chela bears no transverse groove near the articulation of the dactylus and in which the dactylus of the small cheliped of the male is not *Balaeniceps*-shaped, at least when the large specimen from Stat. 279 is really a male. This specimen, which is larger than the others, is 22,5 mm. long. This species differs from *A. distinguendus* by its much smaller size, unfortunately COUTIÈRE does not mention the length of the male referred by him to *A. rapax* (Alpheidae Mald. and Laccad. Archip. 1905, p. 905).

Rostrum acute, almost reaching to the middle of first antennular article, continued in a carina, which, rather acute between the orbital hoods and separated from them by narrow, deep grooves, becomes, posteriorly to the hoods, obtuse, gradually lower and more inconspicuous, though it can be followed almost to the middle of the carapace.

Second antennular article little (about one-fourth) longer than the visible part of the first and 2,5-times as long as thick; third article about half as long as the second. Stylocerite foliaceous, ending in a small spinule that reaches to the end of first antennular article.

Antennal peduncle as long as that of the upper antennae, basicerite with a small spinule on the lower margin, which spinule hardly reaches as far forward as the rostrum. The scaphocerite that extends beyond the antennular peduncle almost by the whole length of third article — in the egg-bearing female from Stat. 313 even by slightly more than this article — is 3-times as long as broad; the outer margin is very slightly concave and the terminal spine extends but for a short distance beyond the blade. Telson twice as long as broad anteriorly, while the width of the posterior margin is a little less than one-third of the length; swimmerets a little longer than the telson.

Of the external maxillipeds that reach as far forward as the antennal peduncle, the terminal joint has a slender form, being 5-times as long as broad; its margins are beset with long setae, those at the tip being one and a half as long as the joint itself; the penultimate joint is almost half as long as the terminal joint and one and a half as long as thick.

The merus of the large cheliped of the male from Stat. 279 is 3,1-times as long as broad, the upper margin ends in a small spinule, as in SPENCE BATE's *A. rapax* (Report Challenger Macrura, Pl. 99, fig. 1 *k*), while the infero-external margin is very finely serrulate along its whole length; the infero-internal margin bears 4 small, movable spinules and ends in a small, acute tooth. Chela similar to that of BATE's *A. rapax*, but its form appears more slender, because it is almost four times as long (7,8 mm.) as high (2,1 mm.); palm compressed, half as thick as high. The upper border of the palm which is almost twice as long (5 mm.) as the fingers, is somewhat flattened, the inner margin is fringed with hairs from the tip of the dactylus to the carpal articulation and there is no transverse groove near the

articulation of the dactylus. Lower border rather sharp, especially that of the immobile finger and fringed also with long hairs at the inner side. Outer face of the palm without crests or ridges, flattened or very slightly concave on the outer face of the immobile finger; palm finely granular, the granulation reaching to the middle of the fingers. Immobile finger a little longer than the dactylus.

Only one female with eggs, long 18 mm., namely that from Stat. 313, bears the large cheliped. Merus 3,4-times as long as broad, the two lower margins as in the male, the upper margin without a spinule at the far end. Chela comparatively smaller than in the male, 5,8 mm. long (palm 3,7 mm., fingers 2,1 mm.) and 1,55 mm. high, for the rest similar to it. Of the small cheliped of the male the merus is 3,5-times as long as broad; upper margin ending in a small spinule, infero-external margin finely serrulate, while the infero-internal bears 5 small, movable spinules and terminates in a small, acute tooth. The chela closely resembles that of DE HAAN's *A. rapax* (J. G. de Man, in: Trans. Linn. Soc. London. Ser. 2, Vol. IX, Pl. XXXIII, Fig. 52), it is but little shorter than the large chela, being 7 mm. long. The palm that measures one-third of the total length, appears one and a half as long as broad and nearly as much compressed as the other chela; the upper border, fringed at the inner side with long hairs to the end of the dactylus, presents no transverse groove. Of the gaping and tapering fingers that are fringed with hairs on their prehensile edges, the immobile appears a little broader at its base than the dactylus.

In the female the merus of smaller cheliped resembles that of the male, but the upper margin is unarmed; the chela differs only by the palm being slightly longer in proportion to the fingers; the palm, indeed, is 1,9 mm. long, the fingers 3,1 mm. Like in the male, the palm appears finely granular under a lens.

The carpal segments of the second legs are, in the male from Stat. 279, 1,4 mm., 1,6 mm., 0,6 mm., 0,56 mm. and 0,76 mm. long; the chela is 1,4 mm. long (palm 0,6 mm., fingers 0,8 mm.). The second segment, 0,27 mm. thick in the middle, appears 6-times as long as thick. In the younger specimen from Stat. 313 the carpal segments are 1,25 mm., 1,5 mm., 0,5 mm., 0,48 mm. and 0,6 mm. long; the chela is 1,25 mm. long (palm 0,52 mm., fingers 0,73 mm.). In the young female, long 15 mm., from Stat. 133 the carpal segments of the left leg are 0,92 mm., 0,88 mm., 0,35 mm., 0,34 mm. and 0,5 mm. long, the chela 1,08 mm. long (palm 0,52 mm., fingers 0,56 mm.); in the right leg they are 0,88 mm., 0,84 mm., 0,34 mm., 0,32 mm. and 0,48 mm. long, chela 1,03 mm. (palm 0,47 mm., fingers 0,56 mm.). The second segment appears but little — one-seventh to one-fifth — longer than the first, in young specimens even slightly shorter, but in the species referred by COUTIÈRE to *A. rapax* it is twice as long as the first.

Ischium of third and fourth legs with a small, movable spine at the base. Merus of third legs unarmed, 5-times as long as broad. The propodus which is one and a half as long as the unarmed carpus, is slightly curved and shows a rather slender form; it presents its greatest width of 0,46 mm. not far from the carpal articulation, it is 6,5-times as long as broad and it narrows a little distally; there are 3 small, equal spines on the proximal half of the lower margin and one of the same length at the distal extremity, both margins are moreover

beset with rather long setae. Dactyli slightly arcuate, measuring two-thirds of the propodus; they are lanceolate, in the middle much broader than high.

Fourth legs shorter than the 3rd, for the rest resembling them.

Unless the contrary was remarked, the preceding description was taken from the male captured at Stat. 279.

Alpheus rapacida differs from *A. rapax* de Haan by its much smaller size, by the second antennular article being little longer than the first, by the slender shape of the large chela and probably by other characters.

†44. *Alpheus lepidus* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 106.

Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 54—90 m. Fine grey sand; coarse sand with shells and stones. 1 egg-bearing female and 1 young specimen.

Stat. 114. July 8. 0° 58′.5 N., 122° 55′ E. Kwandang-bay-entrance. 75 m. Hard sand, very fine. 4 specimens, one of which with eggs.

A new species of small size of the *Brevirostris* group, closely allied to *A. rapacida* de Man.

The largest specimen, one from Stat. 114, is 17 mm. long, the two egg-bearing females 14 mm. and 16 mm. The pointed, acute rostrum reaches a little beyond the middle of the visible part of first antennular article and is almost as broad at its base as it is long; the rostrum, that projects straightly forward, is continued in a narrow, sharp and prominent carina, that extends backward to behind the middle of the carapace. The interorbital part of this carina which is the most striking feature of this species, is concealed by the rounded orbital hoods in a lateral view of the carapace and is separated from them by narrow, moderately deep grooves.

Orbital or frontal region rather narrow, little more than half as broad as the anterior margin of the carapace.

Telson narrow, twice as long as broad anteriorly and 4-times as long as the posterior margin is broad. Second antennular article little (one-third) longer than the visible part of the first and twice as long as thick; third article little more than half as long as the second. Stylocerite very broad, the terminal spine almost reaching to the end of 1st antennular article.

Carpocerite reaching beyond the antennular peduncle by one-third of the third article; inferior spine of basicerite small, shorter than the rostrum, reaching to the middle of the visible part of 1st antennular article. The scaphocerite, the outer margin of which is slightly concave and which just extends beyond the carpocerite, appears about 3-times as long as broad, the blade is rather narrow anteriorly and as long as the antennular peduncle, while the terminal spine extends by one-third of its length beyond the tip of the blade.

Terminal joint of external maxillipeds slender, slightly narrowing distally, 4,5-times as long as broad at base; penultimate joint half as long and a little more than one and a half as long as thick.

Only one specimen, 13,5 mm. long, without eggs, from Stat. 114 bears the large cheliped. Merus 3-times as long as broad, upper margin unarmed at the apex, infero-external margin finely and widely serrulate, infero-internal armed with 4 movable spinelets and ending in a small, acute tooth. Chela slightly turned outward, 3-times as long as high and half as thick as high, distinctly compressed; the palm, twice as long as the fingers, appears finely granular under a lens, the granules are acute and a little larger on the inner than on the outer face. Upper border of the palm obtuse without a transverse groove near the dactylus, fringed, like the lower border, with long hairs at the inner side, from the carpal articulation to the tip of the fingers. In the ova-bearing female the merus of the larger cheliped appears comparatively a little broader than that of the described specimen, which therefore is, no doubt, also a female.

In all the specimens the small cheliped is missing.

In an adult specimen from Stat. 114 the carpal segments of the second legs are 0,8 mm., 1,8 mm., 0,45 mm., 0,45 mm. and 0,56 mm. long; the chela is 1,25 mm. long (palm 0,5 mm., fingers 0,75 mm.). The carpus appears more slender than in *A. rapacida*: whereas the second segment appears in this species 6-times as long as thick, it is in the adult specimen of *A. lepidus*, probably a male, 10-times as long as thick, the second segment being 0,19 mm. thick in the middle. In the egg-bearing female from the same station, however, the carpal segments are 0,72 mm., 1,4 mm., 0,4 mm., 0,4 mm. and 0,5 mm. long; the chela is 1,14 mm. long (palm 0,46 mm., fingers 0,68 mm.), but the second segment, also 0,19 mm. thick, appears in the female comparatively a little thicker than in the male. In the female the second segment is just twice as long as the first, in the male it appears a little longer and the chela is one and a half as long as the first segment.

Merus of third legs unarmed, more slender than that of *A. rapacida*, being 6-times as long as broad; propodus one-third longer than the unarmed carpus, resembling that of *A. rapacida* as regards its form, armed with 3 short spines on the proximal half of its concave, posterior margin and with a similar spine at the distal extremity. Dactylus two-thirds of the propodus, resembling that of *A. rapacida*.

In the female the propodus is one and a half as long as the carpus and the dactylus measures three-fourths the length of the propodus.

Merus of fourth legs measuring two-thirds that of the third.

†45. *Alpheus Sibogae* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 107.

Stat. 49[a]. April 14. 8° 23'.5 S., 119° 4'.6 E. Sapeh-Strait. 70 m. Coral and shells. 1 male.
Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 54—90 m. Fine grey sand; coarse sand with shells and stones. 5 specimens, viz. 2 males, 1 egg-bearing female and 2 younger specimens.
Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 1 egg-bearing female.

An interesting new species of the *Brevirostris* group of small size, the male being 12,5 mm. long, the egg-bearing female 13,5 mm.

Rostrum acute, narrow, 2 to 2,5-times as long as it is broad at base, reaching to the distal third of the visible part of first antennular article and projecting straightly forward, though the extremity is a little turned downward. Rostral carina sharp, continued to just behind the middle of the carapace and bearing, somewhat posterior to the orbital hoods, a small, obtuse tubercle or prominence, situated nearly twice as far from the posterior margin of the carapace as from the tip of the rostrum; interorbital part of the rostral carina slightly concave and concealed, in a lateral view, by the orbital hoods. Orbital region broad, two-thirds the width of the carapace anteriorly; corneae large, one and a half as long as the rostrum, orbits rounded anteriorly, unarmed, anterior margin of the orbital region very slightly concave. Grooves between the orbits and the rostral carina very narrow, moderately deep.

Carapace smooth. Abdominal terga coarsely punctate, lower angle of abdominal pleura subacute, especially those of the 3rd and the 4th somites. Telson narrow, twice as long as broad anteriorly, whereas the distance between the postero-lateral angles is little more than one-fourth the length; spinules of the upper surface inserted about twice as far from the mid-line as from the lateral margins.

Second antennular article slender, about four times as long as thick, one-third longer than the visible part of the first, that is one and a half as long as the third; stylocerite reaching almost to the end of first article. Basicerite with a small spine, shorter than the stylocerite. Carpocerite as long as the antennular peduncle, scaphocerite in the male a little longer than the antennular peduncle, but in the female as long as it, narrow, its greatest width not yet one-fourth of its length. The blade, that narrows anteriorly, hardly reaches beyond the middle of the terminal spine, that measures one-third of the total length of the scaphocerite; outer margin of the latter decidedly concave. In the male the blade reaches to the end of the antennular peduncle, in the female it extends just beyond the end of the second article.

Outer margin of the antepenultimate joint of the external maxillipeds unarmed, lower face with a prominent undulate crest that runs from the proximal to the distal extremity; penultimate joint conical, hardly longer than thick; terminal joint narrowing, five times as long as broad at base, three times as long as the penultimate joint.

Infero-internal margin of the ischium of the larger cheliped of the male coarsely denticulate or tuberculate. Merus 3-times as long as broad, upper margin coarsely denticulate or tuberculate along its whole length, unarmed at apex; infero-external margin finely denticulate, outer face covered with subacute granules that are larger on the upper half, infero-internal margin armed with 4 acicular spinelets and terminating in an acute tooth. Carpus armed at the infero-internal angle with a sharp tooth. Chela turned outward, a little more than one and a half as long as the carapace, 3-times as long as high, compressed, about half as thick as high; upper border of the palm, which is almost 3-times as long as the fingers, rounded, without a transverse groove near the articulation of the latter.

Besides by its rostral carina, *A. Sibogae* is furthermore characterized by a moderately deep groove on the outer face of the palm. This groove that begins near the lower end of the carpus, where it is rather narrow, gradually widens until to the middle of the palm and from here, slightly narrowing again, extends almost to the tip of the immobile finger; this

groove, which, on the middle of the palm, occupies the greatest part of the outer surface, is bounded inferiorly by a ridge that runs parallel with the rounded, lower border of the palm and that is most conspicuous in the middle. Proximally this groove is limited above by an inconspicuous ridge, defining the oval area, but not reaching beyond it. Both the upper and the lower border of the palm are fringed at the inner side with hairs, like in other species. Examined under a lens, the palm appears finely granular, but the groove is nearly smooth, like also the fingers.

Merus of the larger cheliped of the female 4-times as long as broad, for the rest as in the male, but the denticles of the infero-external margin and the subacute tubercles on the upper half of the outer surface and on the upper margin are somewhat larger. Carpus and chela as in the male, but the chela somewhat shorter, little longer than the carapace.

Merus of the small cheliped of the male 3,5-times as long as broad, for the rest resembling that of the large, but the granules and tubercles are smaller. Chela slightly shorter than the other (proportion between the length of the chelae 1,13), palm slightly compressed, 3-times as long as high and hardly longer than the fingers; upper border of the palm without a transverse groove near the dactylus, outer face also with a shallow groove reaching on its lower half from the carpal articulation to that of the fingers and defined inferiorly by a little prominent ridge. The long, pointed extremities of the fingers are crossing one another, the dactylus is *Balaeniceps*-shaped, its upper surface resembles a spoon, when looked at from above, the distal half being elliptical, the proximal half constricted. Palm and proximal half of the fingers finely granular under a magnifying-glass.

Of the small cheliped of the female the merus is 5-times as long as broad, for the rest it agrees with that of the male, but the denticles on the infero-external margin and the subacute granules and tubercles on and near the upper border are larger. Chela a little shorter than the small chela of the male (proportion 1,25); the palm which is slightly shorter than the fingers and nearly 3-times as long as high, resembles that of the small chela of the male, but the groove on the outer face is inconspicuous; fingers slender, tapering and shutting together.

Carpal segments of the second legs of the male 0,92 mm., 1,14 mm., 0,45 mm., 0,5 mm. and 0,46 mm. long, the second segment 10-times as long as thick in the middle; chela 0,7 mm. long (palm 0,28 mm., fingers 0,42 mm.). In the adult female the carpal segments are 0,96 mm., 1,16 mm., 0,48 mm., 0,58 mm. and 0,52 mm. long, the second segment 9-times as long as thick; chela 0,83 mm. long (palm 0,35 mm., fingers 0,48 mm.). These numbers indicate that the carpus is slender, that the 2nd segment is one-fourth or one-fifth longer than the 1st, that the 4th is slightly longer than the subequal 3rd and 5th and that the chela, the fingers of which are in the male one and a half, in the female one and one-third longer than the palm, is a little shorter than the 1st segment of the carpus.

Ischium of 3rd and 4th legs unarmed. Merus of 3rd legs unarmed, slender, 8—9-times as long as broad in the middle; carpus also slender, propodus one-fourth longer than the carpus, straight, not narrowing distally, its posterior margin with 7 or 8 spines; dactylus slightly curved, not broader than high, pointed, half as long as the carpus and two-fifths of the propodus.

†46. *Alpheus acutocarinatus* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 104.

Stat. 2. March 8. 7° 25′ S., 113° 16′ E. Madura-strait. 56 m. Grey mud with some radiolariae. 1 male, without the larger cheliped.

Stat. 19. March 19/21. 8° 44′.5 S., 116° 2′.5 E. Bay of Labuan Tring, West coast of Lombok. 18—27 m. River-mud, coral, coralsand. 1 adult specimen, without small cheliped, probably a male, and a somewhat younger ova-bearing female, which has lost the larger cheliped.

Stat. 116. July 12. 0° 58′.5 N., 122° 42′.5 E. West of Kwandang-bay-entrance. 72 m. Fine sand with mud. 1 adult, ova-bearing female.

Stat. 311. February 12/13. Sapeh-bay, East coast of Sumbawa. Depth up to 36 m. Mud and sand. 1 mutilated, young female.

A new species of the *Brevirostris* group, related to *A. macrosceles* Alc. & Anders. from the Bay of Bengal. The largest specimen, probably a male, is that from Stat. 19, which is 28 mm. long, the carapace, rostrum included, being just half as long as the abdomen. Integument smooth and polished. Orbital region prominent, its width two-thirds that of the anterior margin of the carapace. Rostrum acute, narrow, little longer than broad at base, projecting straightly forward and reaching in most specimens to the middle of the visible part of 1st antennular article, in the female from Kwandang-bay, however, to the distal third. The rostrum is continued in a prominent and sharp carina, that reaches almost to the posterior third of the carapace and that bears, immediately behind the base of the orbital hoods, a small, obtuse tubercle or tooth; this tooth is twice as far distant from the posterior margin of the carapace as from the tip of the rostrum. That part of the rostral carina, which is situated before the median tubercle, runs S-like, the interorbital portion, that in a lateral view is concealed by the orbits, being concave; the rostral carina is separated from the prominent, rounded and unarmed, orbital hoods by deep, though narrow grooves and, at either side of the rostrum, the frontal margin makes an obtuse angle with the anterior margin of the orbits. One observes, in the mid-dorsal line of the carapace, quite posteriorly, a small, acute tubercle, little farther distant from the raised line that runs parallel with the posterior margin than the latter from that line. In the female from Kwandang-bay the rostrum appears a little less broad at its base than in the other specimens.

The pigment of the large eyes is well-developed.

According to the figure 5 of Plate IX of the "Illustrations of the Zoology of the Investigator, Crustacea", the 2nd—4th abdominal pleura should be subacute in *A. macrosceles*; in *A. acutocarinatus*, however, they are regularly rounded. The telson, about half as long as the carapace, is twice as long as its greatest width anteriorly and tapers rather strongly, so that its form is elongate; it suddenly narrows just in front of the middle, so that the distance between the postero-lateral angles is only half as broad as the greatest width; posterior margin very prominent and strongly arcuate. The upper surface is flattened, but beyond the spinules it slopes down towards the lateral margins; of the two pairs of spinules, that are small, 0,24—0,28 mm. long, the anterior pair is situated just in front of the middle,

the posterior pair a little farther distant from the anterior pair than from the posterior margin or just as far distant. In the adult specimen from Stat. 19 the lateral spinules are missing, but in the other, younger specimen the longer inner spinules reach almost to the end of the telson. The two spines of the basal joint of the uropods are very small, especially the outer, which sometimes even is wanting entirely; the uropods are little longer than the telson.

Second antennular article slender, 5-times as long as thick in the middle, almost twice as long as the visible part of the 1st; in the young female from Sapeh-bay, long 18 mm., it appears but little longer than the 1st. Stylocerite a little shorter than basal article, terminating in a slender spine, that is turned outward.

Spine on the basicerite small. Carpocerite hardly reaching to the end of second antennular article. Scaphocerite slender, a little shorter than the antennular peduncle, terminal spine as in *A. macrosceles*, hardly reaching beyond the obtuse tip of the blade, stout, its width at base being one-third its length (Confer: H. Coutière, Bull. Soc. Entom. France, 1898, p. 32, fig. 3′); outer margin of the scaphocerite very slightly concave.

External maxillipeds slender, as long as the antennular peduncle; penultimate joint appearing, in a lateral view, 3-times as long as thick distally, terminal joint one and a half as long as the penultimate, tapering, seven times as long as broad at its base and with obtuse extremity.

Thoracic legs as slender as those of *A. macrosceles* and *A. Talismani*. In the adult male from Stat. 19 the large cheliped, 24,5 mm. long, appears a little shorter than the body. The merus, 6,8 mm. long, reaches as far forward as the antennular peduncle and its form is slender, for it appears six times as long as broad in a lateral view; the upper margin is unarmed, without a spine near the far end, the infero-internal margin carries a few finely-aciculiform spinelets and a somewhat larger one at the distal extremity, the longitudinal ridge on the lower face and the infero-external margin are beset with small, acute granules, that exist also here and there on the outer face like also on the ischium. Carpus short, nearly one and a half as long as thick. Chela, 12,9 mm. long, almost one and a half as long as the carapace and almost twice as long as the merus, slender, six times as long as broad (high), the greatest breadth situated at the proximal fourth; the palm, that measures nearly two-thirds the length of the chela, viz. 8,3 mm., is slightly compressed, about in the proportion of 4 : 3 and it decidedly tapers towards the articulation of the fingers. Both the upper and the lower border of the palm are obtuse, fringed, like in other species, with hairs at the inner side and they are entire; the slightly convex, outer and inner surfaces show no carinae, ridges or depressions at all, but they are finely granulate, especially the inner. Fingers measuring little more than one-third the length of the chela and three-fifths that of the palm, slender, compressed and smooth; dactylus carinate above, obtusely pointed and a little shorter than the immobile finger, the tip of which is more acute; the dactylus bears in the middle an elongate, concave prominence that fits into a hole of the other finger.

The large cheliped of the female resembles that of the male, but is shorter, the chela being hardly longer than the carapace.

Chela of the small cheliped of the male from the Madura-Strait 9 mm. long, nearly one and a half as long as the carapace (9,5 mm.); the palm being 1,06 mm. broad (high) in the middle, the chela appears 9-times as long as broad. The palm that slightly broadens towards the articulation of the fingers, is little longer than the latter, the fingers being 4,3 mm. long, the palm 4,7 mm.; the fingers are more slender than those of the large chela, shut together and the dactylus is *Balaeniceps*-shaped; the fingers, the pointed apices of which are crossing one another, are of equal length. As regards the granulation and as regards the borders that are entire and fringed with hairs at the inner side, the palm agrees with that of the large chela.

The small chela of the female resembles that of the male, but the fingers are more slender, shut together and are slightly longer than the palm, while the dactylus is simple, not *Balaeniceps*-shaped. With regard to the length of the carapace this chela agrees with that of the male. In the female from Kwandang-bay the fingers of the small chela are a little longer than in that from Stat. 19.

The second segment, 8—10-times as long as thick, of the slender carpus of the 2nd legs, is usually but little longer than the first, but in the female from Stat. 19 almost one and a half as long; the three following segments are of subequal length, usually, however, the 4th slightly longer than the two others, but in the female from Kwandang-bay the 4th segment is a little shorter than the 3rd and slightly longer than the 5th; the chela measures two-thirds of the length of the 2nd segment and the fingers are slightly longer than the palm.

Ischium of 3rd and 4th legs with a very small spine at base. Merus of these legs unarmed, those of the 3rd pair slender, 10-times as long as broad; carpus little more than half as long as the merus, the tapering propodus slender, measuring two-thirds of the merus; the dactylus, finally, measures little more than one-third of the propodus, is lanceolate, depressed, pointed and appears in the middle much broader than thick. In the legs of the 5th pair, the carpus is just as long as the merus, while the propodus is a little shorter; dactylus one-third of the carpus, a little more than one-third of the propodus.

Adult male 28 mm. long, the ova-bearing female 23 or 25 mm.

47. *Alpheus macrosceles* Alc. & Anders.

Alpheus macrosceles A. Alcock and A. R. Anderson, in: Journal Asiat. Soc. Bengal, Vol. LXIII, Part II, 1894, p. 153.
Alpheus macrosceles A. Alcock, Indian Deep-sea Crustacea, Decapoda Macrura and Anomala, Calcutta, 1901, p. 140.
Illustrations of the Zoology of the Investigator, Crustacea, Pl. IX, Fig. 5, Calcutta, 1895.
Confer H. COUTIÈRE, in: Bull. Soc. Entom. France, Paris, 1898, N° 3.

Stat. 5. March 10. 7°46′ S., 114°30′.5 E. Bali Sea. 330 m. Mud. 1 egg-bearing female.

It is with some doubt that this specimen is referred to *A. macrosceles*, not only because the legs of the 1st pair are missing, but also because it shows some slight differences from the quoted descriptions.

The pointed rostrum that is one-third longer than broad at its base, reaches a little

beyond the middle of the visible part of first antennular article and is slightly turned upward; it is continued into the obtuse rostral carina, which in a lateral view is not quite concealed by the orbital hoods, from which it is separated by narrow grooves; the rostral carina gradually broadens backward and passes at the base of the orbital hoods into the surface of the carapace. According to ALCOCK and ANDERSON (l. c. 1894) the eyes should be markedly deficient in pigment; in this specimen, however, the black pigment is quite plentiful, reaching almost to the base of the orbital hoods and, at either side of the orbital region, specks of the same pigment occur, just outside the eyes.

In the male of this species the abdominal pleura are of moderate width and subacute, according to the figure in the "Illustrations", but in the female taken by the "Siboga" they are rounded inferiorly and as well developed as in other species.

Telson elongate, 4,5-times as long as the posterior margin is broad, width at the base almost twice that of the posterior margin, the proportion being as 15 : 8; spinules of the upper surface 0,28—0,3 mm. long, anterior pair situated just on the middle, at some distance from the lateral margins, posterior pair almost one and a half as far distant from the posterior margin as from the anterior pair, the proportion between these distances being 11 : 8; posterior margin rounded, rather prominent, the inner longer spines are rather short, though just reaching beyond the posterior margin, the outer are half as long; upper surface of the telson flattened, not grooved.

Second antennular article four times as long as thick, one and a half as long as the visible part of the first, 3rd article two-thirds of the latter; stylocerite ending in a slender spine, that, just reaching beyond the 1st article, is turned outward and upward. In the type specimen figured by COUTIÈRE (l. c.) the stylocerite is directed straightly forward.

Basicerite with well-developed spine, 0,34 mm. long. Carpocerite slender, extending beyond the antennular peduncle almost by the length of 3rd article; in the figure 3′ of COUTIÈRE's quoted paper the carpocerite is not visible, I wish, however, to remark that in the figure 5 of the "Illustrations" the carpocerite appears decidedly longer than the antennular peduncle. Like in the typical specimen figured by Professor COUTIÈRE, the blade of the scaphocerite, the outer margin of which is nearly straight, reaches as far forward as the antennular peduncle, but differently from his figure 3′, the terminal spine, that extends as far forward as the carpocerite, projects with half its length beyond the tip of the blade, in the quoted figure, however, it hardly extends beyond it; the blade is fringed with long hairs.

Terminal joint of external maxillipeds slender, 7-times as long as broad at its base, narrowing towards the distal extremity and 3-times as long as the preceding joint. The left leg of the second pair (the right is missing) extends almost with four segments of the carpus beyond the tip of the carpocerite. Merus very slender, 10—11-times as long as broad in the middle; it bears near the proximal end of the posterior margin a small tooth, that seems to fit into a small hole at the distal extremity of the preceding joint. Carpal segments 2,16 mm., 1,06 mm., 0,46 mm., 0,55 mm. and 0,7 mm. long, chela 1,35 mm. long (palm 0,55 mm., fingers 0,8 mm.); the second segment, half as long as the first and one and a half as long as the fifth, is 5-times as long as thick, the carpus appearing rather slender.

The following legs are also very slender, their meri unarmed; the meri of the 3rd legs are 8,8-times as long as broad, smooth and glabrous. Ischium of 3rd and 4th legs with movable spine.

Eggs small and numerous.

General distribution: Bay of Bengal (ALCOCK, ANDERSON); Andaman Sea (ALCOCK, ANDERSON).

V. *Edwardsii* group.

†48. *Alpheus bis-incisus* de Haan.

Alpheus bis-incisus W. de Haan, Fauna Japonica, Crustacea, 1849, p. 179, Tab. XLV, fig. 3.
Alpheus bis-incisus H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 910, 911.

May 16. 1909. North-coast of Sumatra, to the east of Segli. 40—70 fathoms. 1 male and 1 ova-bearing female collected by Mr. VAN NOUHUIJS.

Unfortunately the female has lost both legs of the 1st pair, while the male bears still only the small cheliped.

Rostrum of the female (in the male the tip is broken) acute, reaching almost to the end of 1st antennular article, the flattened triangle just twice as long, measured in the middle line, as wide at its base and extending a little behind the corneae, so that the distance between the outer angles of the base and the corneae appears half as long as the latter. The frontal margin shows a rounded prominence near the rostrum, from which it is separated by an emargination; both this prominence and this emargination are more conspicuous than in the variety *Malensis* (H. Coutière, l. c. Fig. 48). Antennal region as in this variety, but the 2nd antennular article is one-third longer than the visible part of the 1st and the blade of the scaphocerite appears in the male a little shorter than the antennular peduncle, in the female nearly as long.

In the small cheliped of the male the apex of the upper margin of the merus is obtuse and unarmed, while a few setae are inserted on it; the two other margins are also quite unarmed. Chela hardly more than 4-times as long as high, palm a little shorter than the fingers, the proportion being as 4 : 5. Lower border of the chela rounded, entire, upper border notched a little behind the articulation of the fingers, the notch passing on the outer side into a quadrangular depression or groove, while the inner side of the palm is smooth, entire and convex, in accordance with DE HAAN's description; the fingers shut close together, the dactylus is smooth at the inner side, but one observes on the outer side a row of hairs that runs obliquely from the base upward to the middle of the upper border. The upper border of the dactylus is somewhat flattened at the base and hairy, some rather long setae are inserted also on the immobile finger and on the upper border of the palm.

Second carpal segment of 2nd legs shorter than the 1st, the proportion being 1,6—1,7.

Measurements of 3rd legs in the female: merus 1,85; carpus 1; propodus 1,44. Merus 6-times as long as wide, propodus 7,5-times; the propodus bears 7 spinules, long 0,37—0,52 mm.,

besides one or two somewhat larger ones at the distal end; dactylus about half as long as the carpus and about one-third of the propodus.

The male is 29 mm. long, the female 27 mm.

General distribution: Japan (DE HAAN); New Caledonia (COUTIÈRE).

†49. *Alpheus bis-incisus* de Haan var. *variabilis* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 109.
Confer: *Alpheus bis-incisus* W. de Haan, Fauna Japonica, Crustacea, p. 179, Tab. XLV, fig. 3.

Stat. 71. May 10—June 7. Makassar. Depth up to 32 m. Mud, sand with mud, coral. 18 specimens of different size, males and females, some of which with eggs.

The largest specimen, a male, is considered as the type of this new variable variety. In this specimen which is 25 mm. long, the acute rostrum reaches to the distal fourth of the visible part of 1st antennular article, the rostrum is, however, narrower than in the variety *Malensis* Cout., but not so narrow as in the variety *stylirostris* Cout. (COUTIÈRE, Alpheidae Mald. and Lacc. Archip. 1905, Pl. LXXXVI, figs. 48 and 49), for it is 3-times as long as broad at its base; the upper surface is flattened, as in the two other varieties and as in the typical species, the lateral margins are distinct, though not very sharp and they make right angles with the perpendicular side-walls. The furrows between the rostrum and the orbital hoods are moderately deep, their outer margins are indistinct, rounded; at either side of the rostrum the frontal margin shows a slight, rounded prominence, between which and the rostrum the frontal margin appears concave. Antennular and antennal peduncles, stylocerite and scaphocerite as in the variety *Malensis*, but the outer margin of the scaphocerite appears more concave than in COUTIÈRE's figure 48 and the terminal spine, the point of which is directed inward, reaches to the middle of the 2nd article, the stylocerite, finally, just reaches beyond the 1st article. Spine on the basicerite extremely small, 0,2 mm. long.

External maxillipeds reaching to the middle of third antennular article.

In both chelipeds there is a spine at the far end of the infero-internal margin of the merus, in the larger cheliped larger than in the other. The large chela closely resembles that of the variety *Malensis*, proportion between the length of the chela and the height of the palm 2,4, proportion between the height of the palm and that of the fingers 1,54, proportion between the length of the chela and that of the fingers 2,6; the two last numbers are for the variety *Malensis* respectively 1,6 and 2,75. The lobe on the rounded, upper margin of the palm is subacute, the much broader lobe of the lower margin is also acute, but its external margin runs less obliquely than in the figure 48*a* of COUTIÈRE's paper.

Small chela in the male *Balaeniceps*-shaped, in the female not, different therefore from the variety *stylirostris*. Not only the chela, but the whole cheliped of the male closely resembles that of the male of *A. chiragricus* H. M.-Edw.; proportion between the length of the chela and the height of the palm 4,3 (in the variety *Malensis* 4,7), proportion between the length of the chela and that of the fingers 2,1, the palm being slightly longer than the fingers; the dactylus agrees with that of *A. chiragricus* and the two depressions on the palm are shallow, but distinct.

In an ova-bearing female, long 23,5 mm., in which the rostrum resembles that of the described male, the proportion between the length of the smaller chela and the height of the palm is 4,2 and the fingers are but very little shorter than the palm. In this specimen the prominence at either side of the rostrum is less conspicuous than in the described male.

Only in three other specimens the rostrum agrees with that of the described male being flattened above, in the 14 other specimens the rostrum is not flattened, but rounded above, like in *A. chiragricus*; these specimens, however, for the rest fully agree with the preceding, especially as regards the characteristic form and colouration of the large chela, so that they are referred to the same variety, which therefore may bear the name of *variabilis*. In these specimens the prominence at either side of the rostrum is also less pronounced or wanting at all.

The carpal segments of the 2nd legs are, in the typical male with flattened rostrum, 2,26 mm., 1,1 mm., 0,56 mm., 0,54 mm. and 0,92 mm. long, the second segment is about 3-times as long as thick; chela 1,66 mm. long (palm 0,8 mm., fingers 0,86 mm.). The second segment is only half as long as the first, while in the typical *bis-incisus* and in the two varieties of COUTIÈRE, the second segment appears comparatively longer.

The following legs resemble those of *A. chiragricus*. Merus of 3rd legs 5,3-times as long as broad in the middle; the propodus that measures little more than two-thirds of the merus, appears 6,5-times as long as broad and bears 7 spines along its posterior margin. Dactylus almost half as long as the propodus.

Characteristic is the colouration of the large chela, which is marked with an ochraceous spot on the posterior part of the quadrangular depression on the outer surface of the palm and often the notches of the upper and the lower border of the palm appear also ochraceous; the fingers are sea-green, but their tips are violet.

† 50. *Alpheus proseuchirus* de Man.

J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXX, 1908, p. 111.

Stat. 114. July 8. 0° 58'.5 N., 122° 55' E. Kwandang-bay-entrance. 75 m. Hard sand, very fine. 1 adult egg-bearing female and 2 younger specimens.

Stat. 116. July 12. 0° 58'.5 N., 122° 42'.5 E. West of Kwandang-bay-entrance. 72 m. Fine sand with mud. 1 adult egg-bearing female and 2 younger specimens.

Closely related to *A. pareuchirus* Cout.

Length of the largest specimen, the egg-bearing female from Stat. 114, 25 mm., cephalothorax, rostrum included, 8,5 mm. long, one-third of the whole length: this species attains a much larger size than *A. pareuchirus*. Carapace slightly convex longitudinally, smooth and glabrous. Rostrum as in *A. bis-incisus* de Haan, acute and narrow, reaching almost to the end of 1st antennular article, in younger specimens a little shorter and passing at the base of the eye-hoods, somewhat behind the corneae, into the surface of the carapace. The rostrum is flattened above, narrow-triangular, about 3-times as long as broad at base, the slightly-concave, lateral margins are rather sharp and somewhat overhang the deep orbito-rostral grooves, the outer, orbital margins of which are rounded. The length of the rostrum is one-fourth that of

the carapace, rostrum included. Orbital region a little more than half as broad as the anterior margin of the carapace; its anterior margin is truncate like in *A. pareuchirus*, eye-hoods rounded, unarmed, corneae large.

Telson almost twice as long as broad anteriorly, distance between the postero-lateral angles just half the greatest width; anterior pair of spinules one and a half as far distant from the posterior than from the anterior margin.

Second antennular article, in adult specimens, twice as long as thick, as long as the visible part of the first, third article two-thirds the second; according to COUTIÈRE's figure (Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXXIV, fig. 43), in *A. pareuchirus* the second article appears distinctly longer than the first. Stylocerite terminating in a slender spine that is directed straightly forward and that reaches to the 2nd fourth part of the second article; in younger specimens it hardly reaches beyond the first.

Basal spine of basicerite very small. Carpocerite as long as the scaphocerite, slightly longer than the antennular peduncle; the scaphocerite, the outer margin of which is slightly concave, appears not yet 3-times as long as broad, being in the adult, egg-bearing female from Stat. 114 3 mm. long and 1,16 mm. broad. The terminal spine, that is directed inward, measures about one-third the length of the scaphocerite and appears less slender than that of *A. pareuchirus*, being only $2^1/_3$-times as long as broad at its base, in *A. pareuchirus*, however, 4-times; the terminal spine projects also less far beyond the tip of the blade, for it extends only with one-sixth of its length beyond it and the blade appears therefore also distinctly longer than the antennular peduncle. In young individuals the blade reaches to the end of the antennular peduncle and the 2nd joint of the latter appears here slightly shorter than the visible part of the 1st.

External maxillipeds slender, reaching to the end of second antennular article; penultimate joint 4-times as long as thick, terminal joint one and a half as long as the penultimate and 8-times as long as broad at its base; a short tooth or spine at the distal end of the upper margin of the antepenultimate joint.

Only one specimen bears the larger cheliped, a young specimen long 14,5 mm. without eggs and without the small cheliped, so that it is doubtful whether it is a male or a female; this specimen was collected at the Stat. 114. The merus of this leg is rather slender, about 6-times as long as broad in the middle; upper margin unarmed at the extremity, infero-internal margin with a large, acuminate tooth at the far end and with 2 much smaller spinules in the middle. The chela much resembles that of *A. pareuchirus*, but the fingers are comparatively shorter. The chela, indeed, 7,2 mm. long and 2,4 mm. high, is just 3-times as long as high, but the fingers, 2 mm. long, measure little more than one-fourth the length of the chela. Just as in *A. pareuchirus*, the upper border of the palm is emarginate, immediately behind the articulation of the dactylus, and terminates in a subacute tooth; from this emargination a groove or depression runs backward just below the rounded, upper border of the palm, both on the outer and on the inner face; the groove on the outer surface has parallel margins and reaches to the proximal third of the palm, that on the inner appears triangular and extends only to the middle. The lower margin of the chela appears as little emarginate at the

base of the immobile finger as in *A. pareuchirus*, but the lower margin of the palm is feebly ridged longitudinally; the fingers resemble those of *A. pareuchirus*.

Only two specimens, both from Stat. 116, bear the smaller cheliped, viz. the adult egg-bearing female and a younger specimen. Merus, in the adult female, one and a half as long as that of the larger cheliped, also more slender, 7-times as long as broad in the middle; tooth at the far end of the infero-internal margin a little smaller, on the middle also 2 small spinules. Chela as long as the carapace, rostrum included; fingers almost one and a half as long as the palm, the proportion being as 7 : 5, slender, tapering, shutting together and with the acuminate tips crossing one another. Palm almost cylindrical, 2,5-times as long as high; upper border slightly constricted near the articulation of the dactylus with a trace of the longitudinal groove on the outer face, perhaps also of that on the inner, for the rest smooth and glabrous.

In the young specimen long 14,5 mm. from Stat. 114 the carpal segments of the second legs are 1,8 mm., 1,22 mm., 0,45 mm., 0,5 mm. and 0,8 mm. long, the second segment 7-times as long as thick; chela 1,34 mm. long (palm 0,66 mm., fingers 0,68 mm.). In the adult, egg-bearing female from Stat. 116 the carpal segments are 2,52 mm., 1,6 mm., 0,64 mm., 0,7 mm. and 1 mm. long, the second segment 7-times as long as thick; chela 1,72 mm. long (palm 0,8 mm., fingers 0,92 mm.). These numbers show that the first segment of the slender carpus is one and a half as long as the second and that the second is one and a half as long as the 5th, that the chela, finally, is slightly longer than the 2nd segment. In *A. pareuchirus*, however, the 2nd segment is not shorter than the 1st.

Of the three posterior legs the ischium is armed with a movable spine at the base; these legs are very slender, still more than those of *A. pareuchirus*. So e. g. are the meri of the third legs in the adult female from Stat. 116 9-times as long as broad, their distal extremity is quite unarmed; carpus measuring three-fifths the length of the merus, slender, 8-times as long as thick distally; propodus one-third longer than the carpus, the proportion being as 4 : 3, slender, the propodus being 15- or 16-times as long as broad, the posterior margin with 7 spines that gradually increase in length, the spine at the distal extremity being half as long as the dactylus. Both margins of the propodus are beset with some long setae and long spiniform setae occur at the distal extremities of both margins. Dactylus very slender, simple, one-third the length of the propodus, slightly curved and flattened. In younger specimens the propodus appears a little less slender, the dactylus comparatively somewhat longer.

† 51. *Alpheus Coutierei* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 107.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 1 male and 1 egg-bearing female.

Stat. 282. January 15/17. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. 27—54 m. Sand, coral and Lithothamnion. 1 egg-bearing female.

A remarkable new species of the *Edwardsii* group, which I have the pleasure to dedicate to the learned Carcinologist, by whom science has been enriched with such important works on the Family Alpheidae.

The female from Stat. 282 is 19,5 mm. long, the two other specimens 16 mm. Rostrum acute, projecting straightly forward and just reaching beyond the 1st antennular article; as broad at its base as it is long, the oblique lateral margins of the rostrum make obtuse angles with the frontal margin that runs, from the rostrum, at first transversely, but soon curves backward and downward; the orbital region projects more forward than in most other species, for just half the first antennular article is covered by it. The rostrum is sharply carinate above and this narrow, linear, compressed and prominent carina runs backward, in the adult female, to beyond the posterior third of the carapace, while it is slightly shorter in the two other specimens; the furrows by which the rounded and unarmed, orbital hoods are separated from the rostral carina, are rather broad and widen anteriorly, nearly as in *A. Bouvieri* var. *Hululensis* (Coutière, Alpheidae Mald. and Laccad. Archip. 1905, fig. 46). Gastric and cardiac regions coarsely punctate.

Like in *A. Arethusa*, the abdominal pleura show a different form in the male and in the female. In the male they are produced inferiorly to an angle, subacute on the 1st and the 2nd, but very acute on the four posterior, while the pleura of the 2nd are cordiform; in the female, however, the 1st and the 2nd are much broader, with the infero-posterior angle obtuse and with the lower margin of the 2nd slightly concave; the two following are not triangular as in the male, but their posterior margin is rounded, convex and their lower margin is obtuse, the 5th and especially the 6th nearly agree with those of the male. The telson is 3-times as long as its posterior margin is broad and the latter just half as broad as the greatest width; between the two pairs of spinules that are rather large, 0,22 mm. long, about one-tenth the length of the telson, the upper surface appears broadly grooved from the anterior to the posterior margin, but the groove is rather shallow. Basal joint of the uropods that are but little longer than the telson, armed with two acute spines. Abdomen coarsely, though rather sparsely punctate.

Second antennular article 2,5-times as long as thick, about twice as long as the visible part of the first, third article little longer than that visible part; pointed tip of the stylocerite reaching to the end of first article.

Spinule on the basicerite extremely small, 0,06 mm. long. Carpocerite very little longer than the antennular peduncle and as long as the scaphocerite; outer margin of the latter very concave and the terminal spine that is turned outward, reaches backward to the distal third of second antennular article; the terminal spine projects far beyond the blade, that reaches to the middle of the third article.

External maxillipeds reaching to the end of second antennular article.

Merus of the large cheliped of the adult female 4-times as long as broad in the middle, upper margin somewhat uneven, unarmed at the apex, infero-external margin also slightly uneven; the infero-internal margin bears along its whole length 10 or 11 rounded tubercles and a small acute tooth near the apex. Chela as long as the carapace, 2,5-times as long as the palm is high, fingers hardly half as long as the palm, the total length of the chela being in proportion to that of the fingers as 10 : 3; the fingers are much less high than the palm, their height being in proportion to that of the palm as 2 : 3. The upper margin of the

palm is distinctly notched near the articulation of the dactylus and the lobe behind the notch is rather obtuse; the notch passes on the outer side into a quadrangular depression, that occupies the upper third of the outer surface, on the inner in a quite shallow, triangular depression that runs along the upper margin and that almost extends to the carpal articulation. The distal half of the inner surface appears as a quadrangular depression, whereas the proximal half shows a scattered punctation. The lower margin of the palm presents a concave emargination at the base of the immobile finger, this emargination appears on the outer side triangular like in *A. parvirostris* and the truncate, posterior margin of this notch makes nearly a right angle with the lower border; immediately behind this notch one observes on the outer surface a shallow depression that extends to near the upper quadrangular one and that is recognized the best when the chela is looked at from the under side. Outer surface of palm and fingers sparsely punctate.

The large chela of the male from Stat. 96 is almost one-third longer than the carapace, it resembles that of the female, but the triangular depression on the inner face of the palm is almost inconspicuous, the inner face appears here somewhat hairy. Unfortunately the small chela of the male is missing. In the small cheliped of the female the infero-external and the infero-internal margin are finely tubercular, the tubercles of the infero-internal margin are a little larger than those of the other and the upper margin is also uneven; there is no apical tooth at the inner margin and the upper is also unarmed. Chela little more than half as long as the carapace and 4-times as long as the palm is high in the middle, fingers slightly longer than the palm.

In the right leg of the second pair of the adult female the two first carpal segments are of equal length, the 5th just half as long and the chela, the fingers of which are one and a half as long as the palm, appears nearly as long as the 4th and the 5th segments taken together; in the other leg the 1st segment is somewhat longer than the 2nd.

Ischium of 3rd and 4th legs unarmed, meri also unarmed, those of 3rd pair 5-times as long as wide; propodus two-thirds the length of the merus, one-sixth longer than the carpus, the proportion being as 20 : 17, and the propodus, also 5-times as long as broad, is furnished with 5 or 6 pairs of spinules; dactylus short, almost half as long as the propodus.

Eggs numerous and small.

†52. *Alpheus leviusculus* Dana.

Alpheus Edwardsii, var. *leviusculus* J. D. Dana, U. S. Explor. Exped. Crust. 1852, p. 543, Pl. 34, fig. 3.

Stat. 250. December 6/7. Kur-island. Reef. 1 ova-bearing female.

Alpheus leviusculus Dana, which was considered by Coutière as an abnormal form of *A. Edwardsii*, though it occurs also in the list of species observed by him at Djibouti (Les Alpheidae, Paris, 1899, p. 15 and p. 486), is no doubt a good species, closely approaching to *A. Bouvieri* A. M.-Edw. and *A. Bastardi* Cout.

The specimen from Kur-island is 15 mm. long, unfortunately Dana does not mention the length of his species. The acute rostrum is very short, reaching only to the 2nd third

of the visible part of first antennular article and is continued as a low, rounded ridge that at the end of the corneae already passes into the surface of the body and that is separated from the orbital hoods by narrow and shallow grooves. The rostrum of *A. Bouvieri* is described by COUTIÈRE as "une crête bien distincte, s'étendant au delà des voûtes", while in *A. Bastardi* the orbital hoods are not separated by grooves from one another (COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 908). As regards the orbital region and the frontal margin, *A. leviusculus* resembles *A. Bouvieri* (Coutière, l. c. 1905, fig. 44).

Second antennular article hardly twice as long as thick, little longer than the visible part of the first, while this visible part is but little longer than the third article. Stylocerite ending in a spine that is directed inward and that just projects beyond the first antennular article.

Spine of the basicerite very small. Carpocerite as much longer than the antennular peduncle as in *A. Bouvieri* and *A. Bastardi*. The scaphocerite, the outer margin of which is straight, reaches to the tip of the antennular peduncle; the terminal spine that measures just one-fourth the length of the scaphocerite, extends backward to the anterior end of second antennular article and projects beyond the tip of the blade by one-fourth of its length, farther therefore than in *A. Bastardi*; the blade is probably less broadened distally than in this species.

Telson 3-times as long as the posterior margin is broad, the latter a little more than half as broad as the greatest width; the inner spines near the postero-lateral angles half as long as the posterior margin is broad and extending with more than half their length beyond the tip.

Merus of large cheliped 3-times as long as broad distally, armed with a small, acute tooth at the far end of its infero-internal margin. Chela resembling that of *A. Bouvieri* and *A. Bastardi*, 3-times as long (7,5 mm.) as high (2,5 mm.), fingers half as long as the palm, the margins of which are nearly parallel; as regards the notches on both margins and the form of the depressions on the outer and on the inner face of the palm, the chela also agrees with the two cited species. Merus of the small cheliped resembling the other, with a very small tooth at the end of the infero-internal margin; the chela agrees with DANA's figure 3*d*, but the fingers are slightly longer than the palm and the chela is almost 5-times as long as high.

The carpal segments of the 2nd legs are 1,32 mm., 0,7 mm., 0,32 mm., 0,3 mm. and 0,54 mm. long, the second segment 3,5-times as long as thick; the chela is 0,96 mm. long (palm 0,46 mm., fingers 0,5 mm.). Proportion between the first and the second segment 1,9 and the first segment is just as long as the sum of the three following; in DANA's specimen it was a little shorter.

Merus of 3rd legs 5-times as long as broad, the propodus, which is 8-times as long as broad and armed with 7 spines, is one-fifth longer than the carpus and measures five-sevenths of the merus; the dactylus, finally, measures one-fourth of the merus and little more than one-third of the propodus.

Remarks. This species is certainly different from *A. Bouvieri*, but will perhaps once prove to be identical with *A. Bastardi* Cout.; DANA's name has then, however, the priority.

A. leviusculus Spence Bate (Report Challenger Macrura, p. 549, Pl. XCVIII, fig. 1) seems to be a different form.

General distribution: Wakes Island, North Pacific (DANA).

53. *Alpheus Euphrosyne* de Man.

Alpheus euphrosyne J. G. de Man, in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 745, Taf. 36, fig. 64 and in: Mémoires Soc. Zool. France, 1898, p. 317, Pl. IV, fig. 2.

One specimen from the Postillon Islands, presented by Mr. JACQUIN of Makassar.

This specimen, 58 mm. long and without eggs, is much injured, having lost the 1st, 3rd and 4th legs; it is larger than the specimens hitherto known. The rostrum reaches almost to the middle of the visible part of first antennular article and the scaphocerite is a little longer than the antennular peduncle. The carpal segments of the 2nd legs are 4,4 mm., 2,9 mm., 0,9 mm., 0,9 mm. and 1,6 mm. long, the chela 2,75 mm. (palm 1,2 mm,, fingers 1,55 mm.); the second segment is just one and a half as long as the first.

General distribution: Java Sea (DE MAN); Bangkok (DE MAN).

† 54. *Alpheus microrhynchus* de Man.

Alpheus sp. (*microrhynchus*) J. G. de Man, in: Zoolog. Jahrb. IX, Abth. f. Syst., 1897, p. 752, Taf. 36, fig. 65 and in: Mémoires Soc. Zoolog. France, XI, 1898, p. 318, Pl. IV, fig. 3.
Alpheus microrhynchus G. Nobili, in: Annali Mus. Civ. Storia Nat. Genova, Ser. 2a, Vol. XX, 1900, p. 479 and in: Bollet. Mus. Zool. Torino, XVIII, 1903, p. 7.

Stat. 4. March 9. 7° 42′ S., 114° 12′.6 E. Anchorage off Djangkar (Java). Shore. 1 adult female without eggs and 1 very young specimen.
Stat. 71. May 10—June 7. Makassar. Depth up to 32 m. Mud, sand with mud, coral. 1 adult female without eggs.

The female from Makassar is full-grown, 85 mm. long, twice as large as the specimens heretofore described, the larger specimen from Stat. 4 is 61 mm. long.

The small, acute rostrum reaches in the female from Makassar to the second third of the visible part of first antennular article, it just reaches beyond the rounded, anterior margin of the orbital hoods and is continued as a narrow, obtuse carina, that slightly broadens backward and that only extends as far as the corneae of the eyes; the depressions between this crest and the orbital hoods are broad, but not deep, though quite distinct. The orbital region projects slightly farther than in the younger specimens from Pontianak, described in 1897.

Telson one-fifth longer than its greatest width anteriorly and the latter is in proportion to the posterior margin as 4 : 3. Upper surface flattened, feebly grooved in the median line, anterior pair of spinules placed just in the middle and these spinules are one and a half as far distant from one another as those of the posterior pair. In this specimen the spines near the postero-lateral angles are missing, but in the female from Stat. 4 they are very small, the inner 0,25 mm. long, the outer half that length. In this specimen the telson appears less broad in proportion to its length, resembling more that of *A. Euphrosyne* and the anterior pair of spinules is inserted just in front of the middle.

The antennular and antennal peduncles agree with those of the younger specimen, figured by me (l. c. 1897, fig. 65) and in both specimens the scaphocerite is just as long as the antennular peduncle; the terminal spine extends, however, not so far backward, reaching only to the distal end of 2nd antennular article and in the large specimen from Makassar it

does not reach the rounded tip of the blade, for it only extends to the distal third part of 3rd antennular article. In this specimen the outer margin of the scaphocerite appears very slightly convex, but in the other from Stat. 4 it is straight; in the latter there is no spinule on the basicerite, whereas a very small one, 0,5 mm. long, exists in the specimen from Makassar.

The large chela agrees with the cited description and figure. In the specimen from Makassar this chela is 47 mm. long, the palm 27 mm. long and 18,5 mm. high, in the female from Stat. 4 these numbers are 30 mm., 17,5 mm. and 12 mm. This chela appears therefore one and a half as long as the carapace and 2,5-times as long as high.

In both specimens the fingers of the small chela are decidedly longer than the palm. In the full-grown female from Makassar the proportion between the length of the chela and that of the fingers is 1,88. The height of the palm slightly decreases towards the articulation of the fingers and the proportion between its length and its greatest height near the carpal articulation is 2,33. In the much younger female from Bangkok described in 1898 (l. c.), the fingers were just as long as the palm and the palm 3-times as long as high.

The second legs are, in the adult female from Makassar, 1,4-times as long as the carapace; the carpal segments are 7,8 mm., 3,5 mm., 1,5 mm., 1,5 mm. and 2,3 mm. long, the chela 2,8 mm. long (palm 1,35 mm., fingers 1,45 mm.). The second segment appears a little longer in proportion to the first than in younger individuals.

The following legs much resemble those of *A. Euphrosyne* (J. G. de Man, l. c. 1897, Taf. 36, fig. 64*d*). Merus of 3rd pair 5-times as long as broad and 1,36-times as long as the propodus which distinctly narrows distally and which is armed with 7 spinules along its posterior margin; dactylus about one-third of the propodus.

Remarks. This species much resembles *A. macrodactylus* Ortm., but the rounded rostral carina is longer, reaching to somewhat behind the corneae and it is also more prominent; the large chela has a different form and the fingers of the small chela are longer in proportion to the palm; the second carpal segment appears a little longer with regard to the first and the meri of the following legs are more slender.

General distribution: Pontianak (de Man); Bangkok (de Man); Sarawak (Nobili).

† 55. *Alpheus Audouini* Cout.

Alpheus Audouini H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 911, Pl. LXXXVII, fig. 52.

Stat. 131. July 24/25. Anchorage off Beo, Karakelang-islands. Reef. 7 specimens, 6 of which are much injured and have lost the first pair of legs.
Stat. 174. August 28—29. Waru-bay, North coast of Ceram. Reef. 1 young specimen, without the large cheliped, probably belonging to this species.
Stat. 181. September 5/11. Ambon-anchorage. Reef. 5 specimens, 3 of which with eggs.
Stat. 213. September 26—October 26. Saleyer-anchorage and surroundings. Reef. 1 egg-bearing female.

In his important work on the Alpheidae of the Maldive and Laccadive Archipelagoes Coutière regards as different species *A. Edwardsii* Aud., *A. chiragricus* H. M.-Edw. and he describes as new *A. Audouini* Cout.; *A. chiragricus* should differ from the two others by the

more narrow, subulate rostrum, but with regard to the two others he indicates no other difference than the lobes both on the upper and on the lower border of the palm of the large chela terminating in *A. Edwardsii* in an acute spine, whereas in *A. Audouini* they should be obtuse, "en ogive". Of the 4 specimens of *A. chiragricus* from the Mergui Archipelago that are lying before me, these lobes end in the largest female in a spine, but in the three other specimens they are more or less obtuse. This character appears therefore to be of doubtful value. In the three larger chelae present in the "Siboga" specimens these lobes show the form characteristic of *A. Audouini* and therefore these specimens are referred to this species. One of the egg-bearing females from Amboina is 28 mm. long. The acute rostrum, nearly as broad at its base as it is long, reaches almost to the end of first antennular article and projects horizontally forward; it is continued in a broad, low and rounded ridge, that is separated by shallow grooves from the orbital hoods. A rounded prominence at either side of the rostrum is very small, so that the frontal margin appears nearly straight. Antennal and antennular peduncles with scaphocerite and stylocerite as in *A. Edwardsii* (Coutière, l. c. fig. 50). The large chela agrees with COUTIÈRE's figure 52*a*, but the height of the fingers is a little smaller in proportion to the height of the palm: the chela, indeed, is 12,5 mm. long, the palm 8 mm. long and 5,5 mm. high, the fingers 3,6 mm. high. The chela presents therefore a different shape from that of *A. chiragricus* and more resembles that of *A. bis-incisus* var. *variabilis*, which variety, however, at first sight differs by the more prominent and narrower rostral carina. The small chela of this female nearly agrees with that of the variety *variabilis* of *A. bis-incisus*. Proportion between the length of the first and of the second carpal segments in this female 1,8, according to COUTIÈRE it should be 1,65. The following legs as in *A. chiragricus*.

New researches based on complete and well-preserved specimens are necessary to decide the question whether this pretended species, *A. Audouini*, is really different from the Egyptian *A. Edwardsii* Aud.

General distribution: From the Red Sea to New Zealand and the Hawaiian Islands (COUTIÈRE).

56. *Alpheus chiragricus* H. M.-Edw.

Alpheus chiragricus H. Milne-Edwards, Hist. Nat. Crustacés, II, 1837, p. 354.
Alpheus chiragricus H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, passim in texto, p. 912, Pl. LXXXVI, fig. 51.
Alpheus Edwardsii J. G. de Man, in: Journal Linnean Soc. London, XXII, 1888, p. 266 and in: Archiv f. Naturg. 53. Jahrg. 1888, p. 516 and in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 745 ff., Pl. 36, fig. 64*e* and in: Mémoires Soc. Zool. France XI, 1898, p. 312, Pl. IV, fig. 1 and in: Abhandl. Senckenberg. Naturf. Gesells. XXV, 1902, p. 880—883, passim in texto, Pl. XXVII, fig. 62*b* and 62*c*.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 9—22 m. Mud, coral and coralsand. 1 young male.
Stat. 34. March 27. Anchorage off Labuan Pandan, Lombok. Coralreef. 2 specimens, one of which with eggs, but in both the legs of 1st pair are missing.
Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 1 young specimen captured at a depth of 54—90 m. and another which is still younger and infested by a *Bopyrus*, from the reef; in both specimens the legs of 1st pair are missing.

Stat. 115. July 9/11. East side of Pajunga-island, Kwandang-bay. Reef. 15 mutilated specimens, probably belonging to this species.
Stat. 127. July 20/21. Taruna-bay, Great Sangir-island. Reef. 1 young male.
Stat. 162. August 18. Between Loslos and Broken-islands, West coast of Salawatti. 18 m. Coarse and fine sand with clay and shells. 1 egg-bearing female.
Stat. 163. August 18—20. Anchorage near Seget, West entrance Selee-(Galewo)-strait. Reef. 1 young male and 1 young female, the latter infested by a Bopyrid in the abdomen.
Stat. 176. August 30/31. Anchorage off Lilintah, South coast of Misool. Reef. 1 ova-bearing female.
Stat. 181. September 5—11. Ambon-anchorage. Reef. 14 specimens, males and females, some of which with eggs, but mostly young.
Stat. 299. January 27/29. 10° 52'.4 S., 123° 1'.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. 34 m. Mud, coral and Lithothamnion. 1 ova-bearing female.
Stat. 311. February 12/13. Sapeh-bay, East coast of Sumbawa. Reef. 2 specimens, one of which with eggs, without the legs of the 1st pair.

This species of which I have treated already several times, is considered by Professor COUTIÈRE as a subspecies of *A. Edwardsii* Aud. (H. COUTIÈRE, l. c. 1905), from which it should differ by the subulate form of the rostrum: I don't venture to decide this difficult question, but I wish to refer our specimens to *A. chiragricus*, to which they certainly belong.

According to H. MILNE-EDWARDS *A. chiragricus* attains a length of 3 inches. The largest specimen measured by me, an ova-bearing female probably from Atjeh, had a length of 65 mm. (DE MAN, l. c. 1897), but the largest specimens, collected by the "Siboga", are of a much smaller size, namely an ova-bearing female long 27 mm. and a male long 28 mm., both from Amboina. The rostrum projects either horizontally forward or is slightly directed upward as in the male, long 28 mm. The two male and the two female specimens from the Mergui Archipelago, described by me in 1888 and of which I have treated in the quoted following papers, are again lying before me. Of the large chela of the larger of the two females, figured by me l. c. 1898, Pl. IV, fig. 1 and l. c. 1902, Pl. XXVII, fig. 62*b* and 62*c*, the fingers are little shorter than the palm, the proportion being as 4 : 5 and in this specimen the lobe both on the upper and on the lower border of the palm ends in an acute tooth; in the other specimens, however, the fingers are shorter and the lobes much less acute. In the younger male, long 23 mm., the proportion between the length of the fingers and that of the palm is, indeed, as 3 : 4 and, both in the larger male long 33 mm. and in the younger female long 24 mm., the palm is one and a half as long as the fingers; the length of the fingers appears therefore somewhat variable.

Merus of third legs 5-times as long as broad. In the younger female from the Mergui Archipelago these joints are 4,6 mm. long and 0,95 mm. broad, in a female of equal size from Amboina these numbers are 4,4 mm. and 0,88 mm.; the propodi, that measure two-thirds the meri, are 6-times as long as broad, in the female from the Mergui Islands they are 3,2 mm. long and 0,52 mm. broad, while in the female from Amboina these numbers are 3 mm. and also 0,52 mm.

A. chiragricus may easily be recognized by the narrow, subulate rostrum.

General distribution: "Mers d'Asie" (H. MILNE-EDWARDS); Hongkong (COUTIÈRE); Mergui Archipelago (DE MAN); Atjeh, Java Sea, Bay of Batavia, West-Celebes, Amboina (DE MAN).

57. *Alpheus crassimanus* Heller.

Alpheus crassimanus C. Heller, Crustaceen der Novara-Reise, 1865, p. 107, Pl. X, fig. 2.
Alpheus crassimanus C. Spence Bate, Report Challenger Macrura, 1888, p. 554, Pl. XCIX, fig. 2.
Alpheus crassimanus J. G. de Man, in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 880, Pl. XXVII, fig. 62.
Alpheus lobidens H. Coutière, in: Notes from the Leyden Museum, XIX, 1898, p. 199.

Stat. 50. April 16/18. Bay of Badjo, West coast of Flores. Depth up to 40 m. Mud, sand and shells, according to locality. 1 young male.
Stat. 60. April 27/28. Haingsisi, Samau-island, Timor. Shore. 1 very young male.
Stat. 71. May 10—June 7. Makassar. Depth up to 32 m. Mud, sand with mud, coral. 1 male and 1 ova-bearing female.
Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. Shore. 3 males, 2 of which are very young.
Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 1 very young male.
Stat. 176. August 30/31. Anchorage off Lilintah, South coast of Misool. Reef. 1 male and 1 ova-bearing female.
Stat. 213. September 26—October 26. Saleyer-anchorage and Surroundings. Reef. 1 young male.

The specimens agree with two from Tobelo, Halmahera, described by me in 1902 (l. c.), that are lying before me. The largest specimens are the male long 25 mm. and the female long 26 mm. from Makassar, *A. crassimanus* attains, however, a length of 44 mm. (DE MAN, l. c.). In the female the rostrum almost reaches to the middle, in the male just beyond the middle of the visible part of first antennular article; characteristic of this species is the narrow, compressed, rostral carina, which, slightly broadening backward, is separated by deep, narrow grooves from the prominent, rounded, orbital hoods; in a lateral aspect the carina is concealed by the latter. In the largest male, long 25 mm., from Stat. 86 the rostrum extends almost to the end of 1st antennular article.

The small chela of the male from Makassar fully agrees with COUTIÈRE's figure (Les Alpheidae, 1899, p. 239, fig. 293); this chela is 9,75 mm. long, the palm just as long as the fingers and 3,4 mm. high. In the largest male from Stat. 86, that has the same size as the male from Makassar, both chelipeds are smaller and more slender. The small chela, indeed, is only 7,5 mm. long, the palm 3,4 mm. long and 1,9 mm. high; the large chela is 9,5 mm. long, the palm 5,5 mm. long and 3,7 mm. high, while these numbers are, for the large chela of the male from Makassar, 13 mm., 7 mm. and 6,1 mm.

The carpal segments of the second legs of the young male from Stat. 60, which is 13,5 mm. long, measure 0,96 mm., 0,82 mm., 0,34 mm., 0,36 mm. and 0,62 mm., the chela is 1,06 mm. long (palm 0,52 mm., fingers 0,54 mm.). In this specimen the second segment appears but a little shorter than the first and this fact, combined with the measurements indicated in my work of 1902, proves that the proportion between the length of the first and of the second segment is variable. In the specimen from Stat. 99 which has the same size as that from Stat. 60, the second segment is hardly shorter than the first.

The two specimens from Stat. 176 are noteworthy, because the second and following legs are of a somewhat stouter shape. They are only 15 mm. long and the ova of the female, though few in number, show the same diameter (0,5 mm.) as those of adult specimens. Merus

of second legs 5-times as long as broad, in the adult specimens from Stat. 71 6,4-times. Carpal segments in the female 1 mm., 0,7 mm., 0,3 mm., 0,3 mm. and 0,5 mm. long, second segment hardly 3-times as long as thick in the middle, third segment hardly longer than thick; chela 1 mm. long (palm 0,54 mm., fingers 0,46 mm.). In the male the merus of second legs is 5,3-times as long as broad, the carpal segments are 0,88 mm., 0,78 mm., 0,26 mm., 0,28 mm. and 0,44 mm. long, second segment 3,45-times as long as thick, third segment 0,23 mm. thick; chela 0,92 mm. long (palm 0,5 mm., fingers 0,42 mm.). In the adult specimens from Stat. 71 the second segment is 3,7-times and the third one and a half as long as thick.

Merus of third legs in the male 3,6-times, in the female 3,3-times as long as broad, its shape being stouter than in full-grown specimens, in which this joint is 4,7-times as long as broad (DE MAN, l. c. p. 883); as regards the following joints the specimens from Stat. 176 agree with the adult.

Remarks. Through the kindness of Dr. HORST of the Leyden Museum I was enabled to study the female from Amboina which was referred by COUTIÈRE to *A. lobidens* de Haan: this female proved to belong to *A. crassimanus*. (Vide also p. 328, footnote).

General distribution: Nicobar Islands (HELLER); Djibouti (COUTIÈRE); Amboina (DE MAN); Ternate (DE MAN); Tobelo and Kau, Halmahera (DE MAN).

† 58. *Alpheus pareuchirus* Cout.

Alpheus pareuchirus H. Coutière, Alpheidae Mald. and Lacc. Archip. 1905, p. 906, Pl. LXXXIV, fig. 43.

Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 54—90 m. Fine grey sand; coarse sand with shells and stones. 14 specimens of different size.
Stat. 99. June 28/29/30. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian. 16—23 m. Lithothamnion-bottom. 4 specimens.
Stat. 109. July 5/6. Anchorage off Pulu Tongkil, Sulu-archipelago. 13 m. Lithothamnion-bottom. 1 young specimen.
Stat. 164. August 20. 1° 42'.5 S., 130° 47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 1 young male and 1 younger specimen.
Stat. 260. December 16 and 18. 5° 36'.5 S., 132° 55'.2 E. — 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 1 female.
Stat. 274. December 26. 5° 28'.2 S., 134° 53'.9 E. East coast of Jedan-islands. 57 m. Sand and shells. Stones. 2 specimens.
Stat. 303. April 27/28. Haingsisi, Samau-island near Timor. 36 m. Lithothamnion. 6 specimens.

These specimens, in the largest of which, males and ova-bearing females, the carapace is $5^1/_4$ mm. long, agree pretty well with COUTIÈRE's description and figures, except that the triangular groove on the inner side of the palm of the large chela, which in the typical specimens should be "très faiblement marquée", appears well marked, as deep as the groove on the outer side and with its lower border quite distinct and often coloured.

In the adult male from Stat. 99 the merus of the larger cheliped is 2,6-times as long as broad in the middle and the merus of the smaller fully resembles it. The chela appears a little higher in proportion to its length than in the younger specimens, described by COUTIÈRE, the proportion being 2,67, but in a younger male from Stat. 51 like also in the females

the chela is 3-times as long as high. In the adult male from Stat. 99 the fingers are a little longer than in the typical specimens, the proportion between the length of the chela and that of the fingers being 2,35, but in the younger males the proportion is 2,6. In an ova-bearing female from Stat. 51, long 13,5 mm., the large chela is 3,2-times as long as high, but the fingers that are just as long as the palm is high, appear much shorter than in the male and this is also the case in the ova-bearing female, long 14,5 mm., from Stat. 274, the proportion being here 3 both for the length of the fingers and the height of the palm. The triangular groove on the inner side of the palm appears larger than in COUTIÈRE's figure 43*a* and the rather prominent, lower border of this groove is of a violet colour, like the inner face of the immobile finger and the base of the dactylus.

The small chela of the adult male from Stat. 99, just as long as the carapace, has a rather stout form, the proportion between the length of the chela and the height of the palm being 3,3; the fingers are very little shorter than the palm, the proportion being 1,07. Whereas the lower border of the palm appears but slightly sinuous, the upper is distinctly notched, the posterior lobe being rather acute; both on the outer and on the inner face the triangular groove is well-developed, deep, extending distally downward to the middle of the palm. As in *A. hoplocheles* the palm ends distally, at either side of the articulation of the dactylus, in a sharp tooth, the tooth at the inner side being violet coloured and somewhat larger than the other. Dactylus *Balaeniceps*-shaped, the upper face lanceolate, 2,5-times as long as broad, flattened above but with a prominent ridge that runs from the proximo-internal angle to the obtuse tip; lateral carinae beset with long setae.

The small chela of the adult egg-bearing female from Stat. 51, long 13,5 mm., measures almost two-thirds the length of the carapace and is 5-times as long as high; palm without grooves or notches, fingers simple, slightly longer than the palm, the proportion being 1,15. In the adult, egg-bearing female, long 14,5 mm., from Stat. 274 the small chela agrees with that just described, but the fingers are longer, the proportion between their length and that of the palm being 1,27. In COUTIÈRE's figure 43*c* the second carpal segment appears slightly longer than the first and the fourth a little longer than the third; this is also the case in the specimens collected by the "Siboga", but the length of the second segment is somewhat variable. In the adult male from Stat. 99 the carpal segments are 0,95 mm., 1,23 mm., 0,44 mm., 0,46 mm. and 0,64 mm. long, the chela 0,94 mm. long (palm 0,4 mm., fingers 0,54 mm.); in a younger male from Stat. 51 these numbers are, in the same succession, 0,82 mm., 1 mm., 0,38 mm., 0,42 mm. and 0,5 mm., the chela is 0,8 mm. long (palm 0,35 mm., fingers 0,45 mm.). In the ova-bearing female from the same station the segments measure 0,9 mm., 1,06 mm., 0,36 mm., 0,4 mm. and 0,56 mm., the chela is 0,84 mm. long (palm 0,4 mm., fingers 0,44 mm.) and in the adult female from Stat. 274, finally, the segments are 1 mm., 1,1 mm., 0,36 mm., 0,4 mm. and 0,5 mm. long; the chela measures 0,88 mm. (palm 0,4 mm., fingers 0,48 mm.). Whereas in the first mentioned specimen the second segment appears almost one-third longer than the first, it is only one-tenth longer in the female from Stat. 274. The carpal segments are rather slender, the third segment, e. g., being in the male from Stat. 99 2,44-times as long as thick in the middle, in the younger male 2,5-times, in the female from Stat. 51,

however, 2,1-times and in that from Stat. 274 only 1,93-times; in the last mentioned specimen the carpal segments are hardly more slender than in the variety *Leucothea*.

In the adult male from Stat. 99 the merus of 3rd legs appears 6,4-times, in the adult female from Stat. 51 6,26-times, but in a male from the same station, the carapace of which is 4 mm. long, almost 7-times as long as broad in the middle, just as in the typical specimens, and in this male the distal extremity of the lower margin appears rather sharp, so that, in the adult specimens, the meri are somewhat less slender than in the young. Carpus four-fifths the length of the propodus, dactylus in the adult male a little more than one-third of the propodus, but measuring in the younger male and in the adult female almost half the length of it, the length of the dactylus being slightly variable.

Remark. It is doubtful whether the species, described by PEARSON under this name, is indeed the true *A. pareuchirus*, for, according to this author, the ischium of third legs should be unarmed. (J. PEARSON, Ceylon Pearl Oyster Report, 1905, p. 86).

General distribution: Maldive and Laccadive Archipelago (COUTIÈRE).

† 59. *Alpheus pareuchirus* Cout. var. *Leucothea* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 105.

Stat. 2. March 8. 7° 25′ S., 113° 16′ E. Madura-strait. 56 m. Grey mud with some radiolariae. 1 male.

Stat. 49a. April 14. 8° 23′.5 S., 119° 4′.6 E. Sapeh-Strait. 70 m. Coral and shells. 12 specimens, among which 1 adult egg-bearing female and 7 males of different size.

Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. 54—90 m. Fine grey sand; coarse sand with shells and stones. 1 male and 1 ova-bearing female.

Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. 36 m. Fine, grey mud (river-mud). 2 specimens.

Stat. 96. June 27. South-east side of Pearl-bank, Sulu-archipelago. 15 m. Lithothamnion-bottom. 1 adult female without eggs.

Stat. 99. June 28/29/30. 6° 7′.5 N., 120° 26′ E. Anchorage off North-Ubian. 1 young female taken at the surface of the sea.

Frontal margin at either side of the rostrum straight, transverse, not at all excavate, rostrum as in the typical species. Spiniform tip of the stylocerite extending just beyond the first article. Carpocerite very little longer than the upper peduncle; the scaphocerite, the terminal spine of which is decidedly curved inward, is as long as the carpocerite and the blade usually reaches to the end of the antennular peduncle.

Merus of the large cheliped of a male long 16,5 mm. from Sapeh-Strait 3-times as long as broad in the middle, infero-internal margin with one or two spinules and, at the apex, with a spiniform tooth. Chela a little longer than the carapace, somewhat higher than in COUTIÈRE's specimens, the proportion between the total length and the height of the palm being 2,65. Fingers as long as in the typical species, proportion between the length of the chela and that of the fingers being 2,6. Both the groove on the outer face and that on the inner reach a little more downward than in the typical species; the triangular groove on the inner surface is just as deep as that on the outer and the lower boundary of that inner groove,

which is slightly hairy, appears somewhat sinuous and not coloured, some hairs occur also on the inner face of the palm and immobile finger.

In an ova-bearing female, long 18 mm., from the same station, the large chela is almost 3-times as long as high, viz. 2,8-times, the fingers are a little longer than in the male, the proportion being 2,47. In very young specimens, finally, in which the carapace is 3,75 mm. long, the large chela is, like in the typical species, 3-times as long as high, but the grooves on the palm are as in the adult. Merus of small cheliped of the male also 3-times as long as broad and also armed with a spinule in the middle and, at the apex, with a spiniform tooth. Chela a little shorter than the carapace, 4-times as long as high, fingers a little shorter than the palm, the proportion between the length of the palm and that of the fingers being 1,08 (palm 2,7 mm. long, fingers 2,5 mm., in the male long 16,5 mm.). Upper border of the palm distinctly notched, triangular groove on the outer surface extending downward almost to the middle, triangular groove on the inner side just as deep, but reaching less far downward, inner face of palm and fingers hairy. At either side of the articulation of the dactylus the palm terminates in an acute tooth like in *A. hoplocheles* Cout.; lower border of the palm not notched, but only slightly sinuous. Dactylus *Balaeniceps*-shaped, its upper face slightly convex transversely, 3-times as long as broad; lateral carinae with long setae.

Only one female bears the small cheliped, namely that from Stat. 96, which is 18,5 mm. long. Merus a little more than 3-times as long as broad. Chela measuring two-thirds the length of the carapace, 4-times as long as high, fingers a little longer than the palm, the proportion being 1,1; palm and fingers hairy on the inner side, without grooves or notches, dactylus simple, teeth at either side of the articulation rudimentary.

In the adult male from Stat. 49[a] the carpal segments of the second legs are 1,2 mm., 1,08 mm., 0,4 mm., 0,4 mm. and 0,68 mm. long, the chela 1,14 mm. long (palm 0,54 mm., fingers 0,6 mm.); in a very young male these numbers are in the same succession 0,78 mm., 0,7 mm., 0,28 mm., 0,28 mm. and 0,44 mm., chela 0,83 mm. (palm 0,37 mm., fingers 0,46 mm.) and in an ova-bearing female the carpal segments are 1,35 mm., 1,3 mm., 0,44 mm., 0,46 mm. and 0,68 mm. long, the chela 1,32 mm. long (palm 0,6 mm., fingers 0,72 mm.). In this variety the second segment is a little shorter than the first and the segments show a rather not slender form, the third e.g. being 1,65—1,85-times as long as thick. Ischium of third and fourth legs, like in the typical species, with a movable spine. Merus of third legs less slender than in the typical species, being in the adult male and in the adult female 5,4-times as long as broad in the middle; distal extremity of the lower margin rounded, not acute. Propodus 1,35-times as long as the carpus, with 8 pairs of spinules; dactylus almost half as long as the propodus. The propodus and the carpus are rather hairy, like in the typical species, some setae occur also on the merus.

†60. *Alpheus leptochiroides* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 110.

Stat. 260. December 16 and 18. 5° 36′.5 S., 132° 55′.2 E. 2,3 miles N. 63° W. from the North point of Nuhu Jaan, Kei-islands. 90 m. Sand, coral and shells. 1 male.

A new species of the *Edwardsii* group, closely approaching to *A. pareuchirus* Cout. and to *A. leptochirus* Cout. This specimen, 12,5 mm. long, is probably still young. Rostrum acute, narrow, one and a half as long as broad at its base and reaching to the distal fifth of the visible part of first antennular article; the rostral carina which between the eyes is narrow, strongly compressed, though obtuse, is traceable almost to the middle of the carapace, but, posterior to the orbital hoods, it gradually widens and becomes more and more indistinct. Frontal margin at either side of the rostrum straight, whereas it appears here decidedly concave in *A. leptochirus*; grooves between the rostrum and the rounded, orbital hoods moderately broad and deep. Telson 4-times as long as its posterior margin is broad, the latter half as broad as the greatest width; upper surface not grooved.

Second joint of antennular peduncle very slightly shorter than the visible part of the first, third article measuring two-thirds of the second; in *A. leptochirus* the second article appears distinctly longer than the visible part of the first (COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, fig. 54). Stylocerite larger, i. e. broader, than in the other species and ending in a spine that reaches to the 2nd fourth part of second antennular article. Basicerite with a small spine, long 0,14 mm., on the lower side; carpocerite just as long as the antennular peduncle, the scaphocerite the outer margin of which is concave, projects beyond the antennular peduncle almost as far as the 3rd joint of the latter is long; the blade reaches just beyond the tip of the antennular peduncle and the terminal spine which is slightly curved inward, extends by two fifths of its length beyond the tip of the blade.

Merus of the large cheliped nearly 4-times as long as broad in the middle, apparently of a more slender form than in *A. leptochirus*; infero-internal margin with acute tooth at the apex. The large chela, one-fourth longer than the carapace, much resembles that of *A. leptochirus*, the chela being 3-times as long as broad (high) and the fingers measuring little more than one-fourth of the total length: the proportion, indeed, between the latter and the length of the fingers is 3,5, like in *A. leptochirus*. The narrow notch near the articulation of the dactylus passes into the long, narrow, quadrangular depression on the outer face, that extends to beyond the middle of the palm, the depression on the inner surface is triangular, but rather shallow; differently from *A. leptochirus* but nearly as in *A. pareuchirus* Cout., the lower border is not notched, but only slightly sinuous. The fingers are less high than the palm, just as in *A. leptochirus*.

Merus of the small cheliped 5-times as long as broad in the middle, its infero-internal margin armed with two small spinules and, at the apex, with an acute tooth. Chela measuring two-thirds the length of the large chela, slender, 5,5-times as long as high; fingers just as long as the palm, dactylus *Balaeniceps*-shaped, somewhat less broad than that of *A. leptochirus* (Coutière, l. c., fig. 54*b*), when looked at from above.

Carpal segments of the second legs 1,2 mm., 1 mm., 0,42 mm., 0,5 mm. and 0,7 mm. long, chela 1,14 mm. long (palm 0,54 mm., fingers 0,6 mm.); the second segment is slightly shorter than the first and the first appears just as long as the two last segments taken together and about as long as the chela; fingers little longer than the palm.

The following legs resemble those of *A. leptochirus*. So e. g. the meri of the third legs,

that are, like those of the fourth, unarmed and 7,5-times as long as broad; the carpus measures three-fourths of the propodus, which is 3-times as long as the slender, slightly curved dactylus.

†61. *Alpheus Polyxo* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 108.

Stat. 240. November 22 till December 1. Banda-anchorage. Black sand, coral and Lithothamnion-bank in 18—36 m. 1 male and 1 egg-bearing female.

Both specimens are adult, the male is 22 mm. long, the female 25 mm., the former lacks the large cheliped and in the female both chelipeds are missing. These specimens evidently belong to a new species, but it is doubtful whether they pertain to the *Edwardsii* group or not.

The rostrum of the male is acute, twice as long as broad at its base and reaches to the end of first antennular article; in a lateral view the lower margin projects almost horizontally forward, while the upper appears to ascend, slightly, from the point backwards. The rostrum is continued as a rather low and rounded carina which is separated by moderately broad, though rather deep grooves from the orbital hoods and which, somewhat widening backward, passes at the base of the latter into the surface of the carapace. In the female the rostrum appears almost as broad at its base as it is long and it extends only to the distal fourth of the visible part of first antennular article; the rostral carina is also broader than in the male and much resembles that of *A. Audouini*. At either side of the rostrum the frontal margin runs in the female S-like, obliquely forward and outward, in the shape of a rounded prominence, which prominence, in the male much less marked, appears in a lateral view acute, like in *A. euchirus* Dana.

Carapace and abdomen are smooth and glabrous. Telson 3,4-times as long as its posterior margin is broad, anteriorly twice as broad as the posterior margin; upper surface slightly flattened in the middle, but not grooved, smooth and glabrous. Spinules of the upper surface rather large, inserted nearly midway between the mid-line of the telson and the lateral margins; anterior pair inserted just in front of the middle, posterior pair almost one and a half as far distant from the posterior margin as from the anterior pair; posterior margin slightly prominent in the middle, inner spinules near the postero-lateral angles measuring one-third the width of the posterior margin. Basal joint of caudal swimmerets armed with two short spines of equal length; inner uropod broad, flattened above with the posterior margin rounded, exopod with the movable spine at the postero-lateral angle uncoloured.

Second antennular article in the male 2,4-times, in the female 2,6-times as long as thick in the middle, one and a half as long as the visible part of the first; this visible part appears hardly longer than the third article. Stylocerite terminating in a slender spine that reaches just beyond the first article, one-sixth or one-eighth the length of the second.

Basicerite armed on the lower side with a small spine, 0,5 mm. long, reaching about to the distal third of the visible part of first antennular article; carpocerite projecting beyond the end of the antennular peduncle about by one-third the terminal article. The scaphocerite,

the outer margin of which is slightly concave, is nearly as long as the carpocerite; the terminal spine reaches to the middle of second antennular article, projecting by one-third of its length beyond the tip of the blade which is fringed with long hairs and which reaches almost to the end of the antennular peduncle. Terminal joint of outer footjaws 4,5-times as long as broad, gradually narrowing distally.

The small cheliped of the male closely resembles that of *A. euchirus* Dana, which species was formerly regarded by me, though at that time already with some doubt, as a variety of *A. Hippothoë* de Man (J. G. de Man, in: Zoolog. Jahrb. IX, Abth. f. Syst. 1897, p. 754, Taf. 36, fig. 66—66*c* and in: Notes from the Leyden Museum XX, 1898, p. 210). The outer face of the merus is 2,6-times as long (4,1 mm.) as broad in the middle (1,56 mm.), upper margin unarmed at the apex, infero-internal margin armed with two small spinules and, at the apex, with a slender pointed tooth. Carpus with an acute tooth at the supero-internal angle of its anterior margin. Chela just as long (8,2 mm.) as the carapace, rostrum included, fingers hardly longer than the palm, which is twice as long as high and just as thick as high; the palm is slightly narrowed near the articulation of the fingers, though not notched or emarginate and one observes a trace of a feeble depression on the upper half of the outer (inferior) surface. At either side of the articulation of the dactylus the palm terminates in a subacute tooth, the tooth at the inner side is slightly larger than the other. Dactylus obtusely carinate above from the articulation to the tip, its outer face smooth and almost glabrous, the inner face presenting a hairy crest or ridge, like in the male of *A. euchirus*, and this crest extends from the articulation to the distal third.

Merus of second legs both in the male and in the female 7-times as long as broad; carpal segments in the male 2,45 mm., 0,95 mm., 0,52 mm., 0,47 mm. and 0,82 mm. long, chela 1,73 mm. long (palm 0,82 mm., fingers 0,91 mm.), the second segment 0,35 mm. thick in the middle, 2,7-times as long as thick. In the female the carpal segments are 2,5 mm., 1 mm., 0,6 mm., 0,5 mm. and 0,8 mm. long, chela 1,75 mm. long (palm 0,82 mm., fingers 0,93 mm.), the second segment, like in the male, 2,7-times as long as thick. The first segment of the stout shaped carpus appears 2,5-times as long as the second, that is one-fourth longer than the fifth, the fourth segment is the shortest of all and the chela, the fingers of which are but little longer than the palm, appears a trifle shorter than the three last segments combined.

Ischium of 3rd and 4th legs with a strong, movable spine. Merus of 3rd legs in the male 5,31-times, in the female 5,26-times as long as broad, glabrous and unarmed; carpus a little more than half as long as the merus, in the male 4,3-times, in the female 4,34-times as long as thick, unarmed, with a few setae on the anterior margin; propodus both in the male and in the female 1,26-times as long as the carpus, almost 6-times as long as broad (in the male 5,92-times, in the female 5,8-times), with 11 or 12 spines on the posterior margin, anterior margin setose; dactylus measuring a little more than one-fourth of the length of the propodus, armed at one-fourth of its length from the tip with a small, acute, accessory tooth on the posterior margin. Fourth legs similar to the third.

Eggs small, numerous, globular, 0,5 mm. thick.

Remarks. In his last paper "Ricerche sui Crostacei della Polinesia, Torino, 1907"

the lamented Dr. NOBILI has described, p. 357, a new species, *A. hoplites* Nob., pertaining to the *Edwardsii* group, but in which the dactyli of the 3rd and 4th legs are armed with an accessory claw. It appears therefore quite probable that also *A. Polyxo* once will prove to belong to this group, especially because its other features are those characteristic of this section.

62. *Alpheus strenuus* Dana.

Alpheus strenuus J. D. Dana, U. S. Explor. Exped. Crustacea, 1852, p. 543, Pl. 34, fig. 4.
Alpheus strenuus H. Coutière, in: Notes from the Leyden Museum, XIX, 1897, p. 199 and in: Alpheidae Mald. and Laccad. Archip. 1905, p. 913, Pl. LXXXVII, fig. 53.
Alpheus lobidens W. F. Lanchester, in: Proc. Zool. Soc. London, 1901, p. 563.

Stat. 60. April 27/28. Haingsisi, Samau-island near Timor. Reef. 1 egg-bearing female and 1 very young specimen.
Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. Reef. 1 very large specimen without eggs, 2 egg-bearing females and 2 young specimens.
Stat. 181. September 5/11. Ambon-anchorage. 36—54 m. Mud, sand and coral. 4 specimens, 1 of which with eggs.
Stat. 213. September 26—October 26. Pulu Pasi Tanette. Reef. 1 egg-bearing female.
Stat. 225c. November 8. South-Lucipara-island. Reef. 1 male.
Stat. 258. December 12/16. Tual-anchorage, Kei-islands. 22 m. Lithothamnion; sand and coral. 1 ova-bearing female.

The largest specimen is one from Stat. 93 without eggs, that is 61 mm. long, but, according to Professor COUTIÈRE (l. c. 1905), *A. strenuus* attains a length of 95 mm.; the largest ova-bearing female, that from Stat. 258, is 51 mm. long, but another, from Stat. 93, measures only 39 mm.

According to COUTIÈRE, the merus of third legs should be 3,7-times as long as broad; in the female, long 51 mm., from Stat. 258 the proportion is 4, the merus being 8 mm. long and 2 mm. broad. The other specimens fully agree with it.

Remarks. The most closely related form is *A. crassimanus* Heller. Both species, indeed, resemble one another very much with regard to the rostrum, the telson, the antennal and antennular peduncles, the lobes on the upper and on the lower border of the palm which in both species are obtuse, but *A. strenuus* differs by the small chela being *Balaeniceps*-shaped both in the male and in the female, by the palm of the large chela being less high in proportion to the length and by the fingers being slightly higher with regard to the height of the palm; the notches and the grooves on the palm of the small chela are moreover less conspicuous than in *A. crassimanus*. The examination of two specimens of the species referred by Mr. LANCHESTER (l. c.) to *A. lobidens* de Haan, which specimens, collected at Pulau Bidan, Penang, I was enabled to examine by the kindness of the Direction of the Museum at Cambridge, proved them to belong to *A. strenuus* Dana.

General distribution: Tongatabu (DANA); Rotuma (BORRADAILE); Funafuti (BORRADAILE); Banda-Neira (COUTIÈRE); Aru Islands (COUTIÈRE); Gorontalo (COUTIÈRE); Pulau Bidan, Penang and Kelantan (LANCHESTER); Maldive and Laccadive Archipelagoes (COUTIÈRE); Djibouti (COUTIÈRE).

63. *Alpheus pareuchirus* Cout. var. *imitatrix* de Man.

J. G. DE MAN, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. XI, 1909, p. 106.
Confer: H. COUTIÈRE, Alpheidae Mald. and Laccad. Archip. 1905, p. 906, Pl. LXXXIV, fig. 43.

Stat. 153. August 14. 0° 3'.8 N., 130° 24'.3 E. Halmahera Sea. 141 m. Fine and coarse sand with dead shells. 1 female with eggs.
Stat. 162. August 18. Between Loslos and Broken-islands, West coast of Salawatti. 18 m. Coarse and fine sand with clay and shells. 1 female with eggs.
Stat. 164. August 20. 1° 42'.5 S., 130° 47'.5 E. Between Misool and New Guinea. 32 m. Sand, small stones and shells. 2 specimens, one of which with eggs.
Stat. 305. February 8. Mid-channel in Solor-strait off Kampong Menanga. 113 m. Bottom stony. 7 specimens, 3 of which are adult and ova-bearing.

It is a known fact that in some species of the *Edwardsii* group the dactylus of the small chela of the male, though usually presenting the *Balaeniceps*-form, sometimes appears simple, devoid of the lateral carinae that are usually developed and then resembles the dactylus of the female: this remarkable fact has e. g. been observed in *A. Bastardi* Cout. On the contrary one observes, according to COUTIÈRE, sometimes specimens of *A. Audouini*, in which the dactylus of the small chela of the female shows "la trace très marquée des crêtes sétifères du doigt mobile du mâle" (COUTIÈRE, l. c., 1905, p. 914). It is therefore that the above mentioned specimens, in which the small chela of the female resembles that of the male, the dactylus being *Balaeniceps*-shaped and the palm presenting the same grooves, are considered as a variety of *A. pareuchirus*. The specimens from the stations 162 and 164 resemble the variety *Leucothea* as regards the characters of the second and third legs, but the specimens from Stat. 305 somewhat differ, for the meri of the third and fourth legs appear here just as slender as in the typical species.

In the egg-bearing female from Stat. 162 which is 18,5 mm. long, the large chela appears 3-times as long as high, but the fingers are longer than usually, the proportion between their length and that of the chela being 2,33. In the small chela that measures almost 7 mm., the fingers are as long as the palm and this chela is 4-times as long as high; for the rest it fully resembles the small chela of the male of the variety *Leucothea* de Man.

The legs of the second pair are missing. The merus of the third legs is 5,26-times as long as broad, the proportion between the length of the propodus and that of the carpus is 1,31 and the dactylus is almost half as long as the propodus: all proportions like in the variety *Leucothea*.

In the ova-bearing female, long 20 mm., from Stat. 164 the large chela is also 3-times as long as high, but the fingers are somewhat shorter than in the preceding female; the smaller chela appears a little more slender, 5-times as long as high, but for the rest resembles that of the female from Stat. 162. In this specimen the carpal segments of the 2nd legs are 1,44 mm., 1,35 mm., 0,48 mm., 0,46 mm. and 0,7 mm. long, the chela 1,33 mm. long (palm 0,6 mm., fingers 0,73 mm.) and the third segment appears just twice as long as thick.

Merus of 3rd legs 5,77-times as long as broad, proportion between the length of the propodus and that of the carpus 1,38, dactylus two-fifths of the propodus.

The adult females from Stat. 305 are 24 mm. and 26 mm. long. The large chela of an ova-bearing female, long 24 mm., is 2,86-times as long as high and the proportion between the length of the chela and that of the fingers is 2,35. The smaller chela is 4,3-times as long as high and the fingers are slightly shorter than the palm, the proportion being as 1 : 1,1; the upper surface of the dactylus is 3-times as long as broad. The carpal segments of the second legs are 2 mm., 1,7 mm., 0,65 mm., 0,65 mm. and 1 mm. long, the chela is 1,7 mm. long (palm 0,8 mm., fingers 0,9 mm.); third segment 1,86-times as long as thick. Merus of third legs 6,5-times as long as broad, proportion between the length of the propodus and that of the carpus 1,31; dactylus two-fifths the length of the propodus.

In another ova-bearing female from the same station the carpal segments are 1,94 mm., 1,74 mm., 0,62 mm., 0,62 mm. and 0,94 mm. long, the chela is 1,73 mm. long (palm 0,78 mm., fingers 0,95 mm.) and the third segment is 1,77-times as long as thick. Merus of 3rd legs 6,3-times as long as broad, proportion between the length of the propodus and that of the carpus 1,26; propodus with 9 spinules, dactylus two-fifths of the propodus.

In these specimens from Stat. 305 the carpus of the second legs agrees with that of the variety *Leucothea*, but the merus of the third (and fourth) legs appears as slender as in the typical species.

To this variety the name of *imitatrix* has been given because the female *imitates* the female of *A. strenuus* in having the dactylus of the small chela also *Balaeniceps*-shaped.

64. *Alpheus pacificus* Dana.

Alpheus pacificus J. D. Dana, U. S. Explor. Exped. Crustacea, p. 544, Pl. 34, fig. 5.
Alpheus pacificus H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 909, Pl. LXXXV and LXXXVI, fig. 47.
Alpheus gracilidigitus E. J. Miers, Report Voyage H. M. S. "Alert", 1884, p. 287.
Alpheus gracilidigitus J. G. de Man, in: Max Weber's Zoolog. Ergebn. II, 1892, p. 406, Taf. XXV, fig. 32 and, passim in texto, in: Mémoires Soc. Zool. France, 1898, p. 324, Pl. IV, fig. 5, 5*a*.
Alpheus gracilidigitus G. Nobili, in: Annali Mus. Civ. Storia Nat. Genova, Serie 2a, Vol. XX, 1899, p. 233.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. 22 m. and less. Mud, coral and coralsand. 1 male.
Stat. 58. April 25. Anchorage off Seba, Savu. Reef. 3 ova-bearing females of different size.
Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. Reef. 4 specimens, 3 of which with eggs.
Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Reef. 16 specimens of small size, many of which, however, are ova-bearing.
Stat. 144. August 7/9. Anchorage north of Salomakiëe-(Damar)-island. Reef. 3 young specimens, 1 of which with eggs.
Stat. 169. August 23/25. Anchorage off Atjatuning, West coast of New Guinea. Reef. 2 specimens, probably males.
Stat. 193. September 13/14. Sanana-bay, East coast of Sula Besi. Reef. 1 very young specimen.
Stat. 209. September 23. Anchorage off the South point of Kabaëna-island. Reef. 1 very young specimen.
Stat. 225c. November 8. South-Lucipara-island. Reef. 1 very young specimen.

Stat. 231. November 14/18. Ambon-anchorage. Reef. 1 male and 1 ova-bearing female of medium size.

Stat. 234. November 19/20. Nalahia-bay, Nusa-Laut-island. 46 m. Bottom stony. 1 ova-bearing female.

Stat. 240. November 22 till December 1. Banda-anchorage. Reef. 7 mostly young specimens, 2 of which with eggs.

Stat. 301. January 30—February 1. 10° 38′ S., 123° 25′.2 E. Pepela-bay, East coast of Rotti-island. Reef. 1 ova-bearing female.

According to DANA *A. pacificus* attains a length of one and three-fourths inches (45 mm.), but the largest specimen, taken by the "Siboga", an ova-bearing female from Stat. 93, is hardly 35 mm. long. In this species the females are already ova-bearing at a very young age, so e. g. a female from Stat. 133, which is 15,5 mm. long. In DANA's figure 5*a* the rostrum appears very short, hardly reaching beyond the orbital hoods; as is shown, however, by the numerous specimens collected by the "Siboga", the length of the rostrum is rather variable. In the largest specimen from Stat. 93, like also in most other ones, the rostrum projects horizontally forward almost to the end of first antennular article, presenting the same form as in the figure 47 of COUTIÈRE's quoted paper; in a somewhat younger specimen from the same station the rostrum extends as far forward, but it is slightly turned upward and it appears much narrower at its base; in a young specimen, finally, 18 mm. long, from Stat. 133, the rostrum appears as short as in DANA's figure, but this is apparently an exception. The rostrum proper carries at either side a few, four or five, fine, rather short hairs, like in *A. macrochirus* Richters, though in *A. macrochirus* the hairs are longer and more numerous. The rostral carina is low, rounded above and separated from the orbital hoods by narrow grooves.

A. gracilidigitus Miers is, no doubt, identical with this species. According to the measurements mentioned by COUTIÈRE, the fingers of the small chela should be, in *A. pacificus*, a little shorter in proportion to the palm than they appear in the figure 32 of Pl. XXV of my paper published in 1892 (l. c.), but in the young male, long 20 mm., from Ambon the proportion between the length of the chela and that of the fingers is 1,36, the fingers being almost 3-times as long as the palm and leaving an interspace between them when closed, whereas the palm appears but slightly longer than high. In the other specimens the small chela agrees with the measurements and figures published by COUTIÈRE.

Alpheus pacificus Dana, one of the few species of the *Edwardsii* group, in which the merus of the 3rd and 4th legs is unarmed and in which the dactylus of the smaller chela shows never the *Balaeniceps*-form, may easily be recognized by the shape of the rostrum, of the orbital hoods, of the scaphocerite etc.

Remarks. The species which has been described by HILGENDORF as *A. pacificus* (in: Monatsber. Kön. Akad. Wiss. Berlin, 1878, p. 832) is a different form, in which the merus of the third legs is armed with a tooth and in which the infero-internal margin of the merus of the first pair of legs carries a spine.

General distribution: Red Sea (COUTIÈRE); Madagascar (COUTIÈRE); Maldives and Laccadives (COUTIÈRE); Fiji Islands, Totoya (MIERS); Double Bay, New South Wales (NOBILI); Campbell Island (COUTIÈRE); Sandwich Islands (DANA, MIERS).

†65. *Alpheus malabaricus* (Fabr.) Henderson var. *leptopus* de Man.

Alpheus dolichodactylus Ortm. var. *leptopus* J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen., (2) Dl. XI, 1910, p. 289.

Confer: *Alpheus malabaricus* (J. C. Fabricius), J. R. Henderson, in: Trans. Linn. Soc. London Zool. Ser. 2, Vol. 5, 1893, p. 434, Pl. XL, figs. 1—3.

Alpheus dolichodactylus A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 473, Taf. XXXVI, fig. 11.

Alpheus dolichodactylus F. Doflein, in: Abhandl. k. bayer. Akad. Wiss. II Cl. XXI. Bd. III. Abth. 1902, p. 634.

Stat. 12. March 14. 7° 15′ S., 115° 15′.6 E. Bali Sea. 289 m. Mud and broken shells. 1 egg-bearing female.

Stat. 19. March 19/21. 8° 44′.5 S., 116° 2′.5 E. Bay of Labuan Tring, West coast of Lombok. 18—27 m. River-mud, coral, coralsand. 2 males and 1 ova-bearing female.

Stat. 213. September 26—October 26. Saleyer-anchorage and Surroundings. 18—45 m. Mud and mud with sand. 1 mutilated specimen.

Stat. 311. February 12/13. Sapeh-bay, East coast of Sumbawa. Depth up to 36 m. Mud and sand. 4 males.

Alpheus dolichodactylus Ortm., of which three adult specimens, cotypes, from Sagami bay, Japan, that I received from the Museum at Strassburg, are lying before me, is no doubt identical with a species which in 1893 has been described by HENDERSON as the true *A. malabaricus* Fabr. This identity was already surmised in 1899 by Professor COUTIÈRE ("Les Alpheidae", p. 46 and 48). The basal tooth on the dactylus of the small chela occurs in the japanese specimens exactly as in HENDERSON's figure and the large chela also perfectly agrees with that figured by this author. In the largest of these specimens that is 34 mm. long, the larger chela is 18 mm. long, the fingers 7 mm., just as indicated by HENDERSON but there is no trace of a tooth on the upper margin of the dactylus, which was supposed by this author to occur near the base of this finger, though it was not described by Dr. ORTMANN. In the specimens from Japan the fingers are slightly gaping and this proves to be the only difference, for their form is the same as figured in the "Transactions"; this slight difference, however, may at most be regarded as a local feature, if it is indeed always present and, in this case, the species from Japan should be considered as a variety *dolichodactylus* Ortm.

The specimens, collected by the "Siboga", now differ from those from Japan by their smaller size and by the thoracic legs being of a more slender shape.

The adult egg-bearing female from Stat. 19 is 26 mm. long, the other specimens are of the same size or but a little shorter.

Rostrum acute, almost as broad at its base as it is long, usually reaching to the middle of the visible part of first antennular article and projecting with half its length beyond the rounded and unarmed, orbital hoods, that are as prominent as in *A. paralpheopsides*; in other specimens, as e. g. in the ova-bearing female from Stat. 19, the rostrum reaches only to the 2nd third of the visible part of basal article, hardly projecting beyond the orbital hoods. In a specimen long 20 mm. from Stat. 311 the rostrum is wanting entirely, though the interorbital carina is well-developed: this is, apparently, an abnormal individual. Interorbital carina low, concealed in a lateral aspect by the orbital hoods, gradually widening a little backward and extending to the base of the orbital hoods from which it is separated by narrow, moderately deep grooves.

For the measurements of the telson I refer to Table A: it resembles that of the variety *dolichodactylus*. Posterior margin prominent, semicircular, the outer angles almost indistinct, spinules near the latter very short; spinules of the upper surface rather small, measuring in the male one-tenth, in the female one-twelfth the length of the telson.

Second antennular article 2,5-times as long as thick, in the adult male from Stat. 311 almost one and a half as long as the visible part of first antennular article, in the adult female from Stat. 19 one-third longer than it; third article in the male one-sixth, in the female one-third shorter than the visible part of basal article. In the adult male, long 34 mm., of the variety from the Sagami bay the second antennular article is almost twice as long, viz. 1,9-times, as the visible part of the basal article, according to ORTMANN's description. Stylocerite very broad with pointed extremity, a little shorter than first article. Spinule of the basicerite very small. Carpocerite extending with half the length of third article beyond the tip of the antennular peduncle; scaphocerite very broad, resembling that of *A. Euphrosyne* de Man, as long as the antennular peduncle, its outer margin nearly straight, terminal spine not or hardly extending beyond the rounded tip of the blade and reaching backward to the end of second antennular article or even not so far.

The measurements of the 1st—3rd legs are indicated in the Tables B, C and D. The upper border of the merus of the larger cheliped terminates in a subacute tooth or lobe, infero-internal margin with a pointed spine at the apex. Large chela of the male one and a half as long as the carapace, rostrum included, a little more than 3-times as long as high (broad), fingers a little more than half as long as the palm; both margins distinctly notched, groove on the outer face quadrangular, reaching backward to the middle of the palm, groove on the inner triangular; chela smooth and glabrous. Large chela of the female from Stat. 19 a little more slender than that of the male.

Unfortunately the small cheliped is missing in all the male specimens, but the ova-bearing female from Stat. 19 is provided with it. The merus is one and a half times as slender as that of the larger leg, the infero-internal margin is unarmed, the upper margin truncate at its extremity. Chela as long as the carapace, fingers 3-times as long as the palm, slender, their inner margins shutting together and clothed with long hairs, the inner margins are unarmed.

The second legs agree with those of the variety *dolichodactylus*, as is proved by the Table C. In the adult male from Stat. 311 the carpal segments are respectively long: 1,57 mm., 1,65 mm., 0,45 mm., 0,4 mm. and 0,56 mm.; chela 1,54 mm. long (palm 0,5 mm., fingers 1,04 mm.). In the male long 24 mm. from Stat. 19 the carpal segments measure 1,82 mm., 1,47 mm., 0,4 mm., 0,36 mm. and 0,56 mm.; the chela is 1,58 mm. long (palm 0,56 mm., fingers 1,02 mm.). In the ova-bearing female from Stat. 19 the segments of the carpus are respectively long: 1,8 mm., 1,61 mm., 0,46 mm., 0,42 mm. and 0,6 mm.; the chela is 1,68 mm. long, the palm 0,56 mm., the fingers 1,12 mm.

In the adult typical male of the variety *dolichodactylus* from Japan the carpal segments measure: 2,66 mm., 2,24 mm., 0,7 mm., 0,63 mm. and 0,77 mm.; the chela is 1,86 mm. long (palm 0,67 mm., fingers 1,19 mm.).

These numbers show that the 2nd segment of the rather slender carpus appears sometimes

a little shorter, sometimes slightly longer than the 1st, that the three following segments taken together are a little shorter than the 2nd, that the 4th is a little shorter than the 3rd, that the chela is about as long as the 2nd segment and that finally the fingers are twice as long as the palm.

The following legs are more slender than those of the typical species. Ischium of 3rd and 4th pair with a movable spine. Meri unarmed, those of the 3rd pair 7-times as long as wide; carpus half as long as the merus, propodus 1,6-times as long as the carpus, very slender, unarmed like the carpus, its margins fringed with long setae, two or three of which at the distal extremity are hardly shorter than the dactylus; dactylus half as long as the propodus, lanceolate, flattened and carinate above.

Table A.

	N° 1.	N° 3.	N° 4.	N° 5.
Proportion between the length of telson and the width of posterior margin . .	2,96	3,25	3,3	3,2
Proportion between the width at base and that of posterior margin	1,65	1,6	1,7	1,55
Proportion between the length of the telson and the distance of the anterior pair of spinules from the posterior margin	1,65	1,73	1,7	1,8
Proportion between the distances of both pairs of spinules from the posterior margin	1,76	2,1	2,1	2,25

Table B.

		N° 1. ♀	N° 2. ♂	N° 3. ♀	N° 4. ♂	N° 5. ♂	N° 6. ♀
Proportion between length and width of the merus .	of the larger cheliped	3,3	3,7	4,3		2,2	2,9
Relative dimensions of fingers		1	1	1		1	1
Relative dimensions of total length		2,61	2,9	3,3		3	2,6
Relative dimensions of height		0,8	0,91	0,92		1,2	0,9
Proportion between length and height of the chela .		3,24	3,2	3,6		2,5	3
Proportion between length and width of the merus .	of the smaller cheliped	4		6,2		2,7	3,45
Relative dimensions of fingers		1		1		1	1
Relative dimensions of total length		1,32		1,32		1,27	1,32
Relative dimensions of height		0,19		0,16		0,24	0,23
Proportion between length and height of the chela .		7,1		8		5,3	5,7

Table C.

	N° 1. ♀	N° 2. ♂	N° 3. ♀	N° 4. ♂	N° 5. ♂	N° 6. ♀
Proportion between length and width of the merus .		10	10	9,3	9	
Proportion between length of the merus and that of the carpus		1,5	1,5	1,6	1,66	

Table D.

	N° 1. ♀	N° 2a. ♂	N° 3. ♀	N° 4. ♂	N° 5. ♂	N° 6. ♀
Relative dimensions of merus		1,9	1,9	2	2,07	2
Relative dimensions of carpus		1	1	1	1	1
Relative dimensions of propodus		1,6	1,5	1,63	1,44	1,47
Proportion between the length of merus and propodus		1,17	1,27	1,22	1,43	1,35
Proportion between length and width of the merus .		7	8	7	5,43	6
Proportion between length and width of the propodus		10	10,2	10,9	7	7

N° 1 female from Stat. 12; N° 2 and 2a males, N° 3 female from Stat. 19; N° 4 male from Stat. 311; N° 5 male and N° 6 female of the typical *A. dolichodactylus* Ortm. from Japan.

As is proved by the measurements of Table B, the first pair of legs of the female from Stat. 12 appear of a somewhat stouter shape than in the other specimens of the variety *leptopus*, approaching to the variety *dolichodactylus*. In this female the cutting-edge of the dactylus of the smaller chela is armed with a long, conical tooth near the articulation and opposite to it one observes three or four much smaller teeth on the immobile finger; in the female from Stat. 19 these teeth are wanting, while in the variety *dolichodactylus* they are developed. Unfortunately in this specimen from Stat. 12 the antennae, the antennules and the four posterior legs are missing, it remains therefore doubtful whether this specimen belongs also to the variety *leptopus*. This egg-bearing female is 24 mm. long.

General distribution: The typical *A. malabaricus* is common in the backwater at Pulicat (Coromandel coast) and apparently burrowing in a muddy bottom (HENDERSON). The variety *dolichodactyla* occurs in the Bay of Tokyo (ORTMANN).

† 66. *Alpheus parvirostris* Dana.

Alpheus parvirostris J. D. Dana, U. S. Explor. Exped. Crustacea. p. 551, Pl. 35, fig. 3.
Alpheus parvirostris J. G. de Man, in: Archiv f. Naturgeschichte, 53. Jahrg. 1888, p. 517 and in: Abhandl. Senckenb. Naturf. Gesells. XXV, 1902, p. 886.
Alpheus parvirostris A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 483.
Alpheus parvirostris H. Coutière, Alpheidae Mald. and Laccad. Archip. 1905, p. 906.
Alpheus lineifer E. J. Miers, in: Annals Mag. Nat. Hist. (4) Vol. XVI, 1875, p. 343.

Stat. 19. March 19/21. 8°44'.5 S., 116°2'.5 E. Bay of Labuan Tring, West coast of Lombok. 18—27 m. River-mud, coral, coralsand. 3 specimens, one of which with eggs.
Stat. 60. April 27/28. Haingsisi, Samau-island near Timor. Shore. 1 male and 1 egg-bearing female.
Stat. 71. May 10—June 7. Makassar. Depth up to 32 m. Mud, sand with mud, coral. 1 specimen.
Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 3 specimens, 2 of which with eggs.
Stat. 91. June 22. Muaras-reef, inner side, East coast of Borneo. 2 egg-bearing females.
Stat. 93. June 24/25. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. Reef. 1 male.
Stat. 125. July 18/19. Anchorage off Sawan, Siau-island. Reef. 2 specimens, one of which with eggs.
Stat. 131. July 24/25. Anchorage off Beo, Karakelang-islands. Reef. 1 young male.
Stat. 152. August 12/13. Wunoh-bay, N.W. coast of Waigeu-island. Reef. 1 male and 1 ova-bearing female.
Stat. 220. November 1/3. Anchorage off Pasir Pandjang, West coast of Binongka. Reef. 1 egg-bearing female.
Stat. 261. December 16/18. Elat, West coast of Great Kei-island. Reef. 1 young specimen.

With regard to this species, which is one of small size, the following may be remarked. At either side of the acute, narrow, compressed rostrum, that almost reaches to the end of first antennular article, the anterior margin of the front bears a triangular, though rounded prominence. Corneae large, as broad as the interspace between them, sometimes even broader than that distance as e. g. in the two specimens from Stat. 125. Second joint of antennular peduncle as long or hardly longer than the visible part of the first. Stylocerite ending in a spine that more or less extends beyond the first article and sometimes even reaches to the 2nd fourth part of the second article; according to DANA the stylocerite should be shorter than

the first article (DANA, fig. 3*a*). The strong spine on the basicerite usually reaches to the middle of second antennular article, but sometimes, like in an adult male from Stat. 78, almost to the end; in other specimens, as in an ova-bearing female from Muaras-reef, it hardly extends to the middle of the second article or even, as in the egg-bearing female from Stat. 19, hardly beyond the first article. The terminal spine of the scaphocerite, the outer margin of which is very concave, extends backward to the middle of second antennular article or even a little farther. The small chela is different in the male and in the female. In the adult male, long 13 mm., from Stat. 93, the small chela, little shorter than the carapace, is 4,16 mm. long, the fingers that do not quite shut together, are very slightly longer than the palm which is one-third longer (2 mm.) than high (1,5 mm.). The inner face of the fingers and of the palm except its proximal half is very hairy. In the egg-bearing female from Stat. 125 that has the same size, the small chela is only 2,7 mm. long, little more than half the length of the carapace, rostrum included; the fingers are very slightly shorter than the palm and the latter appears comparatively less high than in the male, the proportion between the length and the height of the palm being in the male as 4 : 3, in the female as 5 : 3. The specimen figured by DANA was therefore certainly a female, for the figure 3*d* agrees with the small chela of the female.

Remark. After COUTIÈRE who was able to study the type specimen of *A. lineifer* Miers from Samoa at the British Museum, this species is identical with *A. parvirostris*.

General distribution: Red Sea (HELLER); Djibouti (COUTIÈRE); Maldive and Laccadive Archipelagoes (COUTIÈRE); Great Redang Island (LANCHESTER); Bay of Batavia (DE MAN); Balabac Strait (DANA); Funafuti (BORRADAILE); Samoa (MIERS); New Caledonia (COUTIÈRE); Japan, Kagoshima (ORTMANN).

67. *Alpheus Hippothoë* de Man.

Alpheus Hippothoë J. G. de Man, in: Journal Linnean Soc. London, XXII, 1888, p. 268, Pl. XVII, fig. 1—5.
Alpheus Hippothoë J. G. de Man, in: Archiv f. Naturges. 53. Jahrg. 1888, p. 518 (partim.).
Alpheus Hippothoë J. R. Henderson, in: Trans. Linn. Soc. Zool. Ser. 2, Vol. V, 1893, p. 436.

Stat. 104. July 2/3. Sulu-harbour, Sulu-island. 14 m. Sand. 1 male and 1 egg-bearing female.

The male is 20 mm. long, the female 17,5 mm., this species attains, however, the length of 28 mm. In the male the rostrum reaches almost to the end of first antennular article, in the female it is slightly shorter; the rostral carina, which in a lateral view appears slightly concave between the eyes, hardly extends beyond the base of the orbital hoods. In both specimens the basicerite carries a small spinule on its anterior lower margin, somewhat larger in the female than in the male. Second joint of antennular peduncle a little longer than the visible part of the first, third joint almost half as long as the second; spiniform extremity of the stylocerite reaching to the end of first article. Terminal spine of scaphocerite extending backward to the proximal third or fourth part of the second antennular article.

The telson rather much narrows backward, its feebly prominent posterior margin is just half as broad as the width at base and the telson is 3,25-times as long as its posterior margin

is broad; anterior pair of spinules one and a half as far distant from the posterior margin as from the anterior. The telson shows a hairy groove in the mid-line and the lateral parts like also the posterior part of the upper face are hairy.

Infero-internal margin of the meri of both legs of 1st pair with a spiniform tooth, which on the merus of the larger cheliped is larger than on that of the other. The large chela resembles the figure 2 of my cited paper, but the palm appears a little longer; this chela, indeed, is 10,5 mm. long, the palm 6,8 mm. long and 4,5 mm. high (or broad), while the fingers are 2,8 mm. high. The lobe on the upper border of the palm is subacute, that on the lower rounded, obtuse.

The small chela of the male fully agrees with Fig. 3 and the dactylus is, like the other finger, hairy at the inner side, but presents no oblique hairy ridge, which occurs in *A. euchirus* Dana. The small chela of the female is a little less high with regard to its length and the fingers are slightly longer than the palm.

Carpal joints of the 2nd legs, in the male, 1,8 mm., 0,58 mm., 0,38 mm., 0,36 mm. and 0,62 mm. long, the chela 1,96 mm. long (palm 0,86 mm., fingers 1,1 mm.); in this not yet full-grown specimen the 1st joint appears 3-times as long as the 2nd and the latter still slightly shorter than the 5th. Ischium of 3rd and 4th legs with a movable spine. Merus of 3rd legs 3-times as long as broad, in the male 3,3 mm. long and 1,04 mm. broad.

General distribution: Mergui Archipelago (DE MAN); Rameswaram (HENDERSON); Bay of Batavia (DE MAN); Amboina (DE MAN).

68. *Alpheus euchirus* Dana.

Alpheus euchirus J. D. Dana, U. S. Explor. Exped. Crustacea, p. 545, Pl. 34, figs. 6*a—f*.
Alpheus euchirus H. Coutière, Les Alpheidae, 1899, p. 235, fig. 288.
Alpheus hippothoë de Man, var.? J. G. de Man, in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 754, Taf. 36, fig. 66—66*c* and in: Notes from the Leyden Museum, XX, 1898, p. 210.

Stat. 7. March 11. 7° 55′.5 S., 114° 26′ E. Reef of Batjulmati, Java. 1 male and 1 female, both young.
Stat. 33. March 24/26. Bay of Pidjot, Lombok. 9—22 m. Mud, coral and coralsand. 1 very young specimen.
Stat. 50. April 16/18. Bay of Badjo, West coast of Flores. Shore. 1 adult male.
Stat. 273. December 23/26. Anchorage off Pulu Jedan, East coast of Aru-islands. (Pearl-banks). 13 m. Sand and shells. 1 male and 1 egg-bearing female, both adult.
Stat. 299. January 27/29. 10° 52′.4 S., 123° 1′.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Depth up to 36 m. Mud, coral and Lithothamnion. 1 very young female.
Stat. 313. February 14/16. Anchorage East of Dangar Besar, Saleh-bay. Reef. 1 adult, egg-bearing female.
Stat. 322. February 24. 1½ mile south of Tandjong Lâjar, South coast of Bawean-island. 32 m. Coral. 1 very young specimen.
Balikpapan, east coast of Borneo. 1 egg-bearing female, collected by Mr. J. W. TISSOT VAN PATOT and preserved in the Zoological Museum of the University of Amsterdam.

All these specimens belong to that form which in 1897 was regarded and described by me as a variety of *A. Hippothoë* de Man; at that time no specimens of the latter were lying before me, but, as the typical *A. Hippothoë* is represented in the "Siboga" collection

by two specimens from Stat. 104, I now come to the conclusion that this so-called variety is in reality a different species. This species is now identified with some doubt with DANA's *A. euchirus* from the Strait of Balabac, with some doubt because DANA makes no mention of the hairy crest at the inner side of the dactylus of the small chela of the male, in the second place because in DANA's figure 6*d* that chela appears somewhat higher with regard to its length than in the "Siboga" specimens and finally because the meri of the 3rd and 4th legs are armed with a much stronger tooth than that of DANA's figure 6*f*. The specimens collected by the "Siboga" appertain, however, probably to that species which is regarded by COUTIÈRE as *A. euchirus* DANA, a young female of which species from Djibouti is lying before me for which I am indebted to that distinguished Carcinologist: I say probably, because the tooth on the merus of the 3rd legs appears in that female smaller than in our specimens of the same size. The largest specimen, the male from Stat. 50, is 25,5 mm. long, this species, however, attains the length of 34 mm. At either side of the rostrum the frontal margin bears a rounded prominence, separated by a concavity from the rostrum and which prominence appears in a lateral view as an acute point, just as in DANA's figure 6*a*; this prominence, which is well developed in the male from Stat. 50 and in other individuals, is sometimes less conspicuous. Telson as in *A. Hippothoë*.

Both chelipeds are armed with a spine at the apex of the infero-internal margin of their meri. The large chela of the male from Stat. 50 that closely agrees with DANA's figure 6*c*, is one and a half as long as the carapace without the rostrum, 2,5-times as long (13 mm.) as high or broad (5,2 mm.) and the fingers are almost half as long (4 mm.) as the palm (9 mm.). The large chela of the male has a more slender form than that of *A. Hippothoë*. The notch on the lower border is less deep than in *A. Hippothoë* and while in both species the groove on the outer face of the palm is triangular, it appears quadrangular in *A. edamensis*.

In the adult male from Stat. 50 the stout carpal segments of the 2nd legs are 2,3 mm., 1,2 mm., 0,56 mm., 0,54 mm. and 0,9 mm. long; chela 2,12 mm. long (palm 1 mm., fingers 1,12 mm.). In the ova-bearing female from Stat. 273 these segments are 1,82 mm., 0,92 mm., 0,52 mm., 0,52 mm. and 0,88 mm. long, chela 2,12 mm. long (palm 0,96 mm., fingers 1,16 mm.). The 1st segment is hardly twice as long as the 2nd, but in adult males a little more than twice as long (DE MAN, l. c. p. 756), in *A. Hippothoë*, however, this segment is comparatively longer; in the specimens that were measured, the chela appears slightly longer than the three last carpal segments taken together.

Merus of 3rd legs 4—4,5-times as long as wide in the middle, armed with a strong acute tooth (DE MAN, l. c. fig. 66).

Both chelae of the first pair are but little hairy on their inner side and are not marked with the small, blue spots that we observe on the chelae of *A. edamensis* and *A. Hippothoë*.

The egg-bearing female from Balikpapan is 34 mm. long, longer than all the specimens previously observed. The rostrum reaches to the distal fourth of the visible part of basal antennular article; the rostral carina appears in a lateral view decidedly concave between the eyes and is traceable, though inconspicuously, almost to the middle of the carapace. Carpocerite and scale of scaphocerite as long as the antennular peduncle, not shorter; outer margin of the

scaphocerite decidedly concave, terminal spine projecting rather far beyond the scale and hardly curved inward. Both chelipeds are missing.

General distribution: Atjeh (DE MAN); ? Balabac Straits (DANA); ? Djibouti (COUTIÈRE).

69. *Alpheus funafutensis* Borr.

Alpheus funafutensis L. A. Borradaile, in: Proc. Zool. Soc. London, 1898, p. 1013, Pl. LXV, figs. 10—10*h*.
Alpheus Hippothoë de Man var. *edamensis* J. G. de Man, in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 757 and in: Abhandl. Senckenb. Naturf. Gesell. XXV, 1902, p. 891.
Alpheus acanthomerus Ortm. var. *inermis* W. F. Lanchester, in: Proc. Zoolog. Soc. London, 1901, p. 564.

Though this species is not represented in the collection of the "Siboga" expedition, the following remarks may be welcome, because the differences between this form and *A. edamensis* de Man are not indicated in Dr. BORRADAILE's description. Through the kindness of Dr. HARMER formerly of the Museum at Cambridge I was enabled to study a type specimen of *A. funafutensis* Borr., an ova-bearing female, long 20 mm., from the island of Funafuti. The much younger specimen, a male, which in my quoted papers of 1897 and 1902 was described by me under the name of *A. Hippothoë* de Man var. *edamensis* de Man, which specimen belongs to my private collection, now proved to appertain to this *A. funafutensis* Borr. This species may at first sight be distinguished from *A. edamensis* by the considerably stouter shape of the three posterior legs. In the Cambridge type the merus of the third legs is 3,1 mm. long, 1,15 mm. broad just in the middle and 1,02 mm. at the level of the point of the tooth, the proportion between the length and the width in the middle being 2,7; in the younger male of my own collection this proportion proved to be even 2,43 and in both specimens the merus appears 3-times as long as broad at the level of the point of the tooth. These legs show therefore even a stouter shape than those of *A. Hippothoë*.

The rostrum of *A. funafutensis* is shorter and reaches in my own specimen hardly beyond the middle of the visible part of first antennular article. In both chelipeds the merus is quite unarmed at the infero-internal margin. Characteristic of this species is also the fact that the inner face of the palm of the large chela is distinctly granulate towards its upper border, though in the young specimen this granulation is less developed. In the smaller chela of the male the dactylus is sharply carinate above, but it bears no crest at the inner side, which, however, appears very hairy.

Remarks. The examination of the single type specimen of *A. acanthomerus* Ortm. var. *inermis* Lanchester, that I also received from the Museum at Cambridge, proved at first sight that this variety is identical with *A. funafutensis* Borr. The latter species has evidently not been examined by Mr. LANCHESTER. In the specimen of the variety *inermis* the merus of third legs proved to be 2,8-times as long as broad in the middle and 3-times as long as wide at the level of the tooth.

General distribution: Besides at Funafuti (BORRADAILE), this species occurs also in the Bay of Batavia or at Amboina, as is proved by the specimen of my own collection, and also on the coast of Kelantan, Malay Peninsula (LANCHESTER).

† 70. *Alpheus edamensis* de Man.

Alpheus Hippothoë de Man var. *edamensis* J. G. de Man, in: Archiv f. Naturg. Jahrg. 53, 1888, p. 518.

Alpheus Hippothoë var. *edamensis* L. Zehntner, Crustacés de l'Archipel Malais. Genève 1894, p. 201.

? *Alpheus Hippothoë* var. *edamensis* H. Lenz, in: Abhandl. Senckenb. Naturf. Ges. XXVII, 1905, p. 383.

Alpheus acanthomerus A. Ortmann, in: Zoolog. Jahrb. V. Abth. f. Syst. 1890, p. 474, Taf. XXXVI, fig. 12 and in: Semon, Zoolog. Forschungsreisen, V, 1894, p. 13.

? *Alpheus acanthomerus* H. Coutière, in: Notes from the Leyden Museum, Vol. XIX, 1897, p. 202.

Nec: *Alpheus Hippothoë* var. *edamensis* J. G. de Man, in: Zoolog. Jahrb. IX. Abth. f. Syst. 1897, p. 757 and in: Abhandl. Senckenb. Naturf. Ges. XXV, 1902, p. 891.

Stat. 58. April 25. Anchorage off Seba, Savu. Reef. 1 adult male and 1 adult, egg-bearing female.

Stat. 77. June 10. 3° 27′ S., 117° 36′ E. Borneo-bank. 59 m. Fine, grey coralsand. 1 adult, egg-bearing female.

Stat. 78. June 10/11. Lumu-Lumu-shoal, Borneo-bank. Reef. 1 adult male and 1 egg-bearing female.

Stat. 79[b]. June 12/13. Pulu Kabala-dua, Borneo-bank. Reef. 1 young specimen.

Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. Reef. 1 young female.

Stat. 115. July 9/11. East side of Pajunga-island, Kwandang-bay. Reef. 1 adult male.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Reef. 1 male.

Stat. 181. September 5/11. Ambon-anchorage. Reef. 1 egg-bearing female and 1 young specimen.

This species, of which both the male and the female attains a length of 37 mm., closely resembles *A. Hippothoë* de Man, from which it differs by the measurements of the carpal segments and by the more slender shape of the three posterior legs. Two cotypes of *A. Hippothoë* var. *edamensis* from Pulu Edam or Amboina and the four specimens described by Zehntner (l. c.), also from Amboina, received respectively from the Museum at Göttingen and from that of Geneva, are lying before me.

In one of the cotypes, an ova-bearing female, the carpal segments of the second legs are 2,3 mm., 3 mm., 1 mm., 1,12 mm. and 1,72 mm. long, the chela is 2,86 mm. long (palm 1,6 mm., fingers 1,26 mm.); in the adult male from Stat. 78 these numbers are respectively: 2,9 mm., 3,5 mm., 1,26 mm., 1,36 mm. and 2,3 mm., chela 3,6 mm. long (palm 1,84 mm., fingers 1,76 mm.); in the adult female from Stat. 77 these segments are 2,4 mm., 3 mm., 1 mm., 1,1 mm. and 2 mm. long, the chela 3,16 mm. (palm 1,8 mm., fingers 1,36 mm.); in the young specimen from Stat. 79[b] they measure 1,35 mm., 1,16 mm., 0,52 mm., 0,52 mm. and 1 mm.; the chela is 1,74 mm. long (palm 0,9 mm., fingers 0,84 mm.) and in the still younger female from Stat. 86 the carpal segments are 0,9 mm., 0,84 mm., 0,32 mm., 0,32 mm. and 0,5 mm. long; the chela is 0,9 mm. long (palm 0,48 mm., fingers 0,42 mm.). These numbers indicate that the first segment measures three-fourths to four-fifths of the second, but that in young specimens the second segment may even be slightly shorter than the first, that the chela appears nearly as long as the second segment, except in the young specimen from Stat. 79[b] which is perhaps abnormal, and that the fingers are always s h o r t e r than the palm, while in *A. Hippothoë* they are always l o n g e r than it.

In this species the meri of the third legs are four-, but in *A. Hippothoë* three-times as long as broad in the middle.

The rostrum always reaches to the end of first antennular article and rarely it extends even just beyond it; as regards the form of the rostral carina and of the frontal margin at either side of it, this species closely resembles *A. Hippothoë*. The telson has a different form, its posterior margin appears in *A. edamensis* broader in proportion to the length of the telson and to its greatest width anteriorly. In *A. edamensis* the posterior margin of the telson measures two-fifths of its length and appears a little broader than half the greatest width; in *A. Hippothoë*, however, the posterior margin appears a little less broad than half the greatest width and measures hardly one-third of the length.

The spine in which terminates the stylocerite is often slightly turned outward.

There is a spine at the far end of the infero-internal margin of the meri of both chelipeds, but in the small cheliped it is very small and may easily be overlooked. In the adult male from Stat. 78 the larger chela which is one and a half as long as the carapace without the rostrum, appears a little more than twice as long as high, this chela being 21 mm. long and 9,5 mm. high; the fingers, 8 mm. long, measure a little more than one-third the length of the chela. The groove on the outer face of the palm is large, quadrangular and occupies two-fifths of the height of the palm, the groove on the inner surface is triangular and extends less far downward.

Unfortunately no male is still provided with the small cheliped, but it is present in the adult male from Amboina of ZEHNTNER's collection. In this specimen the small chela appears just as long as the carapace without the rostrum, 3-times as long as high and the fingers are somewhat longer than the palm; the latter, a little longer than high, is slightly emarginate distally, both on the upper and on the lower border and there is a trace of the quadrangular depression on the outer surface. The fingers are very hairy at the inner side and, as in *A. euchirus*, the dactylus bears a hairy crest at the inner, but not on the outer side; near the articulation of the dactylus the palm is armed with an acute tooth at the inner side and with a smaller one at the outer.

The small chela of the female resembles that of the male, but it has a somewhat more slender form, especially the fingers, and there is no hairy crest at the inner side of the dactylus.

Like in *A. Hippothoë* the chelae are adorned, especially on their inner surface, with numerous, small, circular, blue spots, that sometimes occur also on the outer side, though here much less numerous; in other specimens, like in the adult male from Stat. 78, the fingers are hardly spotted at all, but some spots occur on the distal part of the palm.

Remarks. According to Dr. ORTMANN (l. c. 1894, p. 13) *A. acanthomerus* Ortm. from Tahiti is identical with this species. The egg-bearing female from Stat. 77 closely agrees with the figure 12 in ORTMANN's description (l. c. 1890), except the rostrum which in our specimen reaches to the end of first antennular article, whereas it appears much shorter in that figure. This is, however, no doubt an individual difference.

General distribution: Pulu Edam, Bay of Batavia (DE MAN); Amboina (DE MAN, ZEHNTNER); Tahiti (ORTMANN).

†71. *Alpheus* sp.

Stat. 33. March 24/26. Bay of Pidjot, Lombok. Depth 22 m. and less. Mud, coral and coral-sand. 1 egg-bearing female.

Unfortunately this specimen has lost the large cheliped and the legs of the 2nd, 4th and 5th pairs, so that I do not like to describe it as a new species, which it seems to be: it closely resembles *A. parvi-rostris* Dana, but it differs at first sight by the more slender shape of the third legs that are unarmed.

Rostrum acute, twice as long as broad at its base, reaching to the end of first antennular article, frontal margin presenting at either side an obtuse prominence, exactly as in *A. parvi-rostris*; the lower margin of the rostrum projects horizontally forward, while the upper margin is ascending. Rostral carina subacute, compressed, separated by narrow, deep grooves from the rounded orbits, posteriorly obtuse and hardly reaching beyond the base of the latter. Telson 3,6-times as long (1,38 mm.) as its posterior margin is broad (0,38 mm.), greatest width twice as broad (0,8 mm.) as the posterior margin; spinules of the upper surface 0,15 mm. long, at some distance from the lateral margin, anterior pair inserted just in front of the middle, its distance from the base of the telson being in proportion to the distance from the posterior margin as 3 : 4; posterior pair just as far distant from the anterior pair as from the posterior margin; inner spinules of the hardly prominent, posterior margin half as long as the latter.

In a female of the same size of *A. parvi-rostris* from Stat. 91 the posterior margin of the telson measures one-third of its length, being broader than in the species from Stat. 33, and it is a little broader than half the greatest width; the anterior pair of spinules is situated more forward, just as far from the anterior margin as the posterior pair from the posterior margin and the latter distance is one and a half as large as the distance between the two pairs of spinules.

The second antennular article is twice as long as thick, one-third longer than the visible part of the first and one and a half as long as the third article; the stylocerite ends in a slender spine that is turned inward and it reaches to the 2nd sixth part of the second antennular article.

Basicerite armed, just as in *A. parvi-rostris*, with a long, slender spine, that reaches as far forward as the stylocerite; carpocerite hardly longer than the antennular peduncle, scaphocerite with the outer margin as strongly concave as in *A. parvi-rostris*, a little longer than the antennular peduncle, terminal spine reaching backward to the distal extremity of the first antennular article, while the blade extends to the middle of the third. In the female of *A. parvi-rostris* the stylocerite reaches almost to the 2nd third part of the second antennular article and the blade extends to the tip of the antennular peduncle.

Outer face of the merus of small cheliped 3-times (in the female of *A. parvi-rostris* 2,5-times) as long as broad, infero-internal margin with a long, slender spine at the far end, exactly as in that species; chela almost 4-times as long as high, fingers very slightly longer than the palm. In the female of *A. parvi-rostris* the small chela appears a little stouter, i. e. higher with regard to its length, but for the rest agrees with the preceding.

Ischium of 3rd and 4th legs with a strong, movable spine. Merus of 3rd legs unarmed,

4,6-times as long as broad in the middle, carpus half as long, 3,4-times as long as thick, propodus 1,53-times as long as the carpus, 6-times as long as broad, slightly narrowing distally and armed with 9 spines that progressively increase in length, anterior margin of carpus and propodus with some long setae, of which three or four stronger ones occur at the distal extremity. Dactylus simple, measuring one-third the length of the propodus.

In *A. parvi-rostris* the 3rd legs are of a stouter shape and their merus is armed with an acute tooth. So in the female from Stat. 91 the merus is only 3,8-times as long as broad, carpus half as long, but only 3-times as long as thick, propodus 4,4-times as long as broad, proportion between the length of the carpus and that of the propodus 1,36; dactylus slightly more than one-third the length of the preceding joint.

This species from Stat. 33, that bears only a few ovoid eggs, large, 0,7 mm. long, probably once will prove to belong to the *Edwardsii* group.

ON THE GEOGRAPHICAL AND BATHYMETRICAL DISTRIBUTION

OF THE SPECIES OF *SYNALPHEUS* Sp. Bate AND *ALPHEUS* Fabr. COLLECTED BY THE SIBOGA EXPEDITION.

Synalpheus Sp. Bate.

I have indicated at pages 188 and 189 that we know at present that some species of the genus *Synalpheus* are sedentary animals, living in sponges, corals etc. and that they are not free swimming. In order to further the possibility of drawing general conclusions about the habitat and manner of life of the species of this genus, I have tried to gain some information from the occurrence of the "Siboga" species. I refer to the List of Stations (page 446) indicating at which *Synalphei* were collected by this expedition, being at the same time a List of the species collected at each station.

This List teaches us that the 38 species and 9 varieties brought home by the "Siboga" were collected at 49 different stations.

At 17 stations specimens were taken on coralreefs at low water tide under and between pieces of coral or by breaking the latter with a hammer or otherwise. They belonged to the following 15 species and varieties:

Syn. bituberculatus de Man
Syn. carinatus (de Man)
Syn. carinatus (de Man) var. **ubianensis**
Syn. Charon (Heller) [de Man
Syn. consobrinus de Man
Syn. hastilicrassus Cout.
Syn. Heroni Cout.
Syn. hilarulus de Man
Syn. modestus de Man
Syn. paraneomeris Cout. var. *halmaherensis* de Man
Syn. paraneomeris var. *praedabundus* de Man
Syn. paraneomeris var. *prolatus* Cout.
Syn. streptodactylus Cout.
Syn. Theophane de Man
Syn. tumidomanus (Paulson).

Both *Syn. paraneomeris* Cout. var. *praedabundus* de Man and *Syn. streptodactylus* Cout. were caught at 4 different localities, the other species only at one or two. Those printed in heavy type have also been collected on *Lithothamnion* banks or at least on a bottom covered with pieces of *Lithothamnion* and corals. This appeared to be a kind of bottom exceedingly favourable to an abundant occurrence of *Synalphei*.

The following table shows that no less than 31 species and varieties of *Synalpheus* were taken on a *Lithothamnion* bottom in depths varying between 3 and about 40 m.

Syn. amabilis de Man
Syn. amboinae (Zehntner)
Syn. Antenor de Man
Syn. bispinosus de Man
Syn. bituberculatus de Man
Syn. biunguiculatus (Stimpson) Cout.
Syn. carinatus (de Man)
Syn. carinatus (de Man) var. *ubianensis* de Man
Syn. consobrinus de Man
Syn. Demani Borr.
Syn. fossor (Paulson) var. *propinqua* de Man
Syn. gracilirostris de Man
Syn. Gravieri Cout.
Syn. hastilicrassus Cout.
Syn. Heroni Cout.
Syn. Iocasta de Man
Syn. Iphinoë de Man
Syn. miscellaneus de Man
Syn. neomeris (de Man)
Syn. neptunus (Dana)
Syn. Nilandensis Cout.
Syn. Nilandensis Cout. var. *bandaensis* de Man
Syn. Nilandensis Cout. var. *oxyceros* Cout.
Syn. Pescadorensis Cout.
Syn. quadridens de Man
Syn. quadrispinosus de Man
Syn. septemspinosus de Man
Syn. streptodactyloides de Man
Syn. streptodactylus Cout.
Syn. Theophane de Man
Syn. tumidomanus (Paulson).

Max Weber has shown [1]) that a primary condition for the occurrence of *Lithothamnion* is the existence of a strong tidal current. From this point of view it is interesting to note that the List of Stations teaches that at 7 stations five or more species of *Synalpheus* have been gathered. These are Stat. 49[a] with 5, Stat. 164 with 12, Stat. 240 with 10, Stat. 273 also with 10, Stat. 282 with 18(!), Stat. 310 with 5 and Stat. 315 with 8 species. Now the named localities are also characterized by strong tidal currents and by a very abundant animal life, especially by Sponges, Alcyonids (*Spongodes*) and Gorgonids on and between which the specimens of *Synalpheus* were living.

The data given in this List show clearly that the species of *Synalpheus* collected by the "Siboga" were chiefly taken from shallow water. There are only three hauls exceeding 100 meters, the deepest lying between 400 and 120 m. (Stat. 65[a]). The maximum development in species is in the zone between about 5 and 60 meters.

The List of Stations appears to teach furthermore that the Indo-australian *Synalphei* are sedentary animals, for all the specimens were caught by the dredge or other appliances for securing bottom-living specimens; or they were collected on coralreefs or semi-parasitically on Sponges, Gorgonids, Alcyonids, Pearl-oysters etc.

Alpheus Fabr.

In the following table the numbers of the two first columns indicate on how many different reefs and on how many localities covered by *Lithothamnion* the species of *Alpheus*, the

1) Max Weber, Introduction et description de l'expédition. Siboga-Expeditie, Livr. III, 1902, p. 36.

names of which are printed alphabetically, have been collected. In the five following columns it has also been indicated by numbers how many times a species or a variety has been caught in a definite zone of depth, about which, however, the following should be remarked: when, for instance, a species was taken between 9 and 27 m. depth, it has been inserted in the fourth column (between 10 and 50 m.), the greatest depth turning the scale.

TABLE.

Species	Reef	Litho-thamnion	Meters 0—10	10—50	50—100	100—200	200—400
acutocarinatus de Man.	—	—	—	2	2	—	—
acuto-femoratus Dana	2	—	—	—	—	—	—
Alcyone de Man	—	4	—	4	1	—	—
Arethusa de Man	—	1	—	1	—	—	—
Audouini Cout.	4	—	—	—	—	—	—
barbatus Cout.	3	—	—	—	—	—	—
bicostatus de Man	—	1	—	2	—	—	—
bidens (Oliv.)	2	3	—	1	2	—	—
bis-incisus de Haan var. *variabilis* de Man	—	—	—	1	—	—	—
chiragricus H. M.-Edw.	8	1	—	3	1	—	—
collumianus Stimps.	3	7	1	5	1	—	—
consobrinus de Man.	4	3	—	3	—	—	—
Coutierei de Man	—	2	—	1	1	—	—
crassimanus Heller	4	1	—	3	—	—	—
edamensis de Man	7	—	—	—	1	—	—
euchirus Dana	3	1	—	4	—	—	—
Eulimene de Man	—	1	—	—	1	—	—
facetus de Man	1	—	—	1	—	—	—
frontalis H. M.-Edw.	12	4	—	6	1	—	—
gracilipes Stimps.	2	1	—	1	1	—	—
gracilis Heller var. *luciparensis* de Man	1	—	—	—	—	—	—
Hailstonei Cout. var. *assimulans* de Man	—	1	—	—	2	1	—
Hailstonei Cout. var. *laetabilis* de Man	—	5	—	3	4	—	400–120 m. (1 specimen)
Hippothoë de Man	—	—	—	1	—	—	—
insignis Heller	1	—	—	—	—	—	—
lepidus de Man	—	—	—	—	2	—	—
leptochiroides de Man	—	—	—	—	1	—	—
leviusculus Dana	1	—	—	—	—	—	—
Lutini Cout.	2	—	—	—	—	—	—
macrochirus Richters	3	—	—	—	—	—	—
macrosceles Alc. & Anders.	—	—	—	—	—	—	330 m. (1 specimen)
malabaricus (Fabr.) Henderson var. *leptopus* [de Man	—	—	—	3	—	—	289 m. (1 specimen)
malleodigitus (Sp. Bate)	4	1	—	1	—	—	—

Species	Reef	Litho-thamnion	Meters 0—10	10—50	50—100	100—200	200—400
malleodigitus (Sp. Bate) var. *gracilicarpus* [de Man	—	4	1	2	1	—	—
microrhynchus de Man	1	—	—	1	—	—	—
microstylus (Sp. Bate)	2	—	—	—	—	—	—
microstylus (Sp. Bate) var.?	1	—	—	—	—	—	—
Miersi Cout.	—	3	1	3	—	—	—
pachychirus Stimps.	1	2	—	2	—	—	—
pacificus Dana	11	—	—	2	—	—	—
paraculeipes Cout.	—	1	—	—	1	—	—
paradentipes Cout.	—	—	—	1	—	—	—
paralcyone Cout.	—	7	1	12	2	1	—
pareuchirus Cout.	—	3	—	4	3	—	—
pareuchirus Cout. var. *imitatrix* de Man	—	—	—	2	—	2	—
pareuchirus Cout. var. *Leucothea* de Man	—	2	—	2	3	—	—
parvi-rostris Dana	9	—	—	2	—	—	—
parvus de Man	—	—	—	1	—	—	—
Philoctetes de Man	—	1	—	1	—	—	—
Polyxo de Man	—	1	—	1	—	—	—
praedator de Man	1	—	—	—	—	—	—
proseuchirus de Man	—	—	—	—	2	—	—
pubescens de Man	—	1	—	5	1	—	—
rapacida de Man	—	—	—	3	—	—	—
rapax Fabr.	—	—	—	1	—	—	—
savuensis de Man	1	—	—	1	—	—	—
Sibogae de Man	—	—	—	—	2	1	—
spongiarum Cout.	1	—	—	2	—	1	—
Stanleyi Cout. var. *dearmatus* de Man	1	1	—	1	—	—	—
strenuus Dana	4	1	—	1	1	—	—
tenuicarpus de Man.	—	—	—	1	1	—	—
tenuipes de Man	—	—	—	—	1	—	—
ventrosus H. M.-Edw.	3	2	—	3	1	—	—

Of the 53 species and 9 varieties, mentioned in this Table, only *A. bicostatus* de Man and *A. pareuchirus* Cout. var. *Leucothea* de Man were also observed floating on the surface of the sea, like the plankton. But the fact that the first named species was also drawn up two times from depths between 10 and 50 m. and the second species two times from depths between 10 and 50 m. and three times from depths between 50 and 100 m. by bottom-nets, proves positively, in connection with the other data, that the Indo-australian species of *Alpheus* are truly bottom-living animals. They are besides inhabitants of shallow water, which is proved by the following: representatives of the genus *Alpheus* were collected by the "Siboga" expedition at 83 different stations, but only five of these are situated at depths exceeding 100 meters. The greatest depth from which with certainty a species of *Alpheus* (*A. macrosceles* Alc. & Anders.) was drawn up, proved to be 330 m. In another case (*A. Hailstonei* Cout. var. *laetabilis* de Man)

the dredge was let down at first to a depth of 400 m., but during the haul the depth diminished rapidly to 120 m. and the dredge, when drawn up, was torn. *A. malabaricus* (Fabr.) Henderson var. *leptopus* de Man, finally, has once been collected at a depth of 289 m., but three times between 10 and 50 m. The fact that the species of *Alpheus* are indeed shallow-water forms results still more clearly from the following. Of the 63 species and varieties, enumerated above, 31 have been collected on coralreefs, as is shown by the table. They were captured at low tide in small pools on the reef and between blocks of coral. Of these 31 species 11 were taken exclusively on coralreefs, 2 moreover on shallow banks of *Lithothamnion*, while the remaining 18 were caught also outside the reefs by dredge and trawl, but only *A. spongiarum* Cout. at a depth exceeding 100 m.

Twenty nine species were caught on a *Lithothamnion* bottom. Of these species 13 were taken also on the reefs. Among the remaining 16 species 7 were collected exclusively on *Lithothamnion*, while 9 were taken on other grounds. How much the reef and the *Lithothamnion* bottom are favourite habitats to these animals, is proved by the table. Some species appear from it to have been taken at 8, 9, 11 and even 12 different reefs and their predilection for a bottom of *Lithothamnion* is proved by the following. At 83 stations species of *Alpheus* were taken, only at 18 stations [1]) five or more species were collected. When overlooking these 18 stations, one observes that in ten of these localities the bottom was covered exclusively or at least for a part with *Lithothamnion*.

These creatures apparently find a safe and secure habitat between the ramifications and the projecting parts of the pieces of *Lithothamnion*, with the colour of which they no doubt more or less agree when alive. The tidal current, which is a condition of vital importance for the *Lithothamnion*, will, no doubt, supply plenty of food, just as is done also by the tidal current on the reefs.

1) I leave intentionally three other stations (51, 71, 213) out of regard, because here different localities — situated very closely near one another — have been united.

LIST OF THE STATIONS

WHERE THE SPECIES OF *SYNALPHEUS* AND OF *ALPHEUS* HAVE BEEN COLLECTED BY THE "SIBOGA".

STATION 2. 7° 25′ S., 113° 16′ E. Madura-strait. Captured by trawl in 56 m. depth on bottom of grey mud with some radiolariae.

A. acutocarinatus de Man.
A. pareuchirus Cout. var. *Leucothea* de Man.

STATION 4. 7° 42′ S., 114° 12′.6 E. Anchorage off Djangkar (Java). Shore.

A. microrhynchus de Man.

STATION 5. 7° 46′ S., 114° 30′.5 E. Bali Sea. Captured by deep-sea trawl on a bottom of mud in a depth of 330 m.

A. macrosceles Alc. & Anders.

STATION 7. 7° 55′.5 S., 114° 26′ E. Reef of Batjulmati, Java.

A. euchirus Dana.

STATION 12. 7° 15′ S., 115° 15′.6 E. Bali Sea. Captured by trawl on a bottom of mud and broken shells in a depth of 289 m.

A. malabaricus (Fabr.) Henderson var. *leptopus* de Man.

STATION 19. 8° 44′.5 S., 116° 2′.5 E. Bay of Labuan Tring, West coast of Lombok. Captured by trawl and dredge on a bottom of river-mud, coral, coralsand in a depth of 18—27 m.

A. acutocarinatus de Man.
A. malabaricus (Fabr.) Henderson var. *leptopus* de Man.
A. parvi-rostris Dana.

STATION 33. Bay of Pidjot, Lombok. Dredged on mud, coral and coralsand in about 20 m. depth.

Syn. bispinosus de Man.
Syn. carinatus (de Man).
Syn. Demani Borr.
Syn. streptodactylus Cout.
A. chiragricus H. M.-Edw.
A. euchirus Dana.
A. pacificus Dana.
A. paralcyone Cout.
A. sp. (N° 71).

STATION 34. Anchorage off Labuan Pandan, Lombok. Coralreef.

Syn. paraneomeris Cout. var. *praedabundus* de Man.
A. barbatus Cout.
A. chiragricus H. M.-Edw.

STATION 37. Sailus ketjil, Paternoster-islands.

Syn. paraneomeris Cout. var. *praedabundus* de Man. On coralreef.
A. bicostatus de Man.
A. frontalis H. M.-Edw.
A. Miersi Cout.
A. savuensis de Man.
Dredged on a bottom of coral and coralsand in a depth of 27 m. and less, close to reef.

STATION 40. Anchorage off Pulu Kawassang, Paternoster-islands. Coralreef.

A. microstylus (Sp. Bate) var.?

STATION 43. Anchorage off Pulu Sarassa, Postillon-islands. Dredged on coral bottom in about 30 m. depth.

Syn. neptunus (Dana).
Syn. streptodactylus Cout.

A. Alcyone de Man.
A. paralcyone Cout.
A. pubescens de Man.

STATION 49a. 8° 23'.5 S., 119° 4'.6 E. Sapeh-Strait. Dredged on bottom with coral and shells in 69 m. depth. A very strong tidal current is running in this strait.

Syn. Gravieri Cout.
Syn. Iphinoë de Man.
Syn. neptunus (Dana).
Syn. Nilandensis Cout. var. *bandaensis* de Man.
Syn. quadrispinosus de Man.

A. Hailstonei Cout. var. *laetabilis* de Man.
A. paralcyone Cout.
A. pareuchirus Cout. var. *Leucothea* de Man.
A. Sibogae de Man.

STATION 50. Bay of Badjo, West coast of Flores. Dredged on mud, sand and shells up to 40 m. depth (except *A. euchirus* Dana).

Syn. amboinae (Zehntner).
Syn. streptodactylus Cout.

A. crassimanus Heller.
A. euchirus Dana. Shore.
A. paralcyone Cout.

STATION 51. Madura-bay and other localities in the southern part of Molo-strait. Dredged on fine grey and coarse sand with shells and stones from 54 and 69 to 91 m. depth.

Syn. Gravieri Cout.
Syn. Iphinoë de Man.
Syn. Nilandensis Cout.
Syn. trispinosus de Man.

A. chiragricus H. M.-Edw.
A. lepidus de Man.
A. pareuchirus Cout.
A. pareuchirus Cout. var. *Leucothea* de Man.
A. Sibogae de Man.
A. sp. (N° 35).

(One of the 2 specimens of *A. chiragricus* is from the reef).

STATION 53. Bay of Nangamessi, Sumba. Captured by trawl on a bottom of coralsand, near the shore mud, up to 36 m. depth.

A. frontalis H. M.-Edw.

STATION 58. Anchorage off Seba, Savu. Coralreef.

Syn. Heroni Cout.

A. edamensis de Man.
A. pacificus Dana.
A. savuensis de Man.

STATION 60. Haingsisi, Samau-island near Timor. On coralreef.

A. crassimanus Heller.
A. frontalis H. M.-Edw.
A. macrochirus Richters.
A. parvi-rostris Dana.
A. strenuus Dana.

STATION 61. Lamakera, Solor-island. Reef.

A. frontalis H. M.-Edw.

STATION 64. Kambaragi-bay, Tanah-Djampeah. Dredged on coralsand in about 30 m. depth.

Syn. biunguiculatus (Stimpson) Cout.

STATION 65a. Near Island of Tanah Djampeah. During haul of dredge the depth diminished rapidly from 400 to 120 m. and the bottom changed from mud to coral in which the dredge was caught and broken.

Syn. odontophorus de Man.
Syn. streptodactylus Cout.

A. Hailstonei Cout. var. *laetabilis* de Man.

STATION 66. Bank between Islands of Bahuluwang and Tambolungan, south of Saleyer. Dredged on Bank of dead coral, Lithothamnion and Halimeda, 8 to 10 m. deep.

Syn. Heroni Cout.

A. collumianus Stimps.
A. malleodigitus (Sp. Bate) var. *gracilicarpus* de Man.
A. Miersi Cout.
A. paralcyone Cout.
A. sp. (N⁰ 15).

STATION 71. Makassar and surroundings. Caught with the dredge in about 30 m. depth on sand with mud. (Except *Syn. streptodactylus*).

Syn. Iocasta de Man.
Syn. streptodactylus Cout. On coralreef.

A. bis-incisus de Haan var. *variabilis* de Man.
A. crassimanus Heller.
A. microrhynchus de Man.
A. parvi-rostris Dana.
A. pubescens de Man.

STATION 77. 3° 27′ S., 117° 36′ E. Borneo-bank. Dredged on a bottom of fine, grey coralsand in a depth of 59 m.

A. edamensis de Man.
A. pubescens de Man.

STATION 78. Lumu-Lumu-shoal, Borneo-bank. Reef.

Syn. bituberculatus de Man.
Syn. Theophane de Man.

A. collumianus Stimps.
A. consobrinus de Man.
A. edamensis de Man.
A. insignis Heller.
A. parvi-rostris Dana.
A. ventrosus H. M.-Edw.

STATION 79ᵇ. Pulu Kabala-dua, Borneo-bank. Reef.

A. edamensis de Man.
A. macrochirus Richters.

STATION 80. 2° 25′ S., 117° 43′ E. Borneo-bank. Caught on a bottom of fine coralsand in a depth from 50 to 40 m.

A. paralcyone Cout.

STATION 81. Pulu Sebangkatan, Borneo-bank. Dredged in a depth of 34 m. on coral bottom and Lithothamnion.

A. ventrosus H. M.-Edw.

STATION 86. Anchorage off Dongala, Palos-bay, Celebes.

Syn. streptodactylus Cout. On coralreef.

A. crassimanus Heller. On coralreef.
A. edamensis de Man. On coralreef.
A. pareuchirus Cout. var. *Leucothea* de Man. Caught by trawl on a bottom of fine, grey mud (river-mud) in a depth of 36 m.

STATION 91. Moearas-reef, inner side: East coast of Borneo.

Syn. consobrinus de Man. Dredged on hard coral-sand in about 25 m. depth.
Syn. hastilicrassus Cout. On coralreef.

A. parvi-rostris Dana. Dredged on hard coralsand in about 25 m. depth.

STATION 93. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago.

A. collumianus Stimps. Caught on a bottom of Lithothamnion, sand and coral, 12 m. deep.
A. frontalis H. M.-Edw. Reef.

STATION 93. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago.

A. malleodigitus (Sp. Bate) var. *gracilicarpus* de Man. Caught on a bottom of Lithothamnion, sand and coral, 12 m. deep.
A. pacificus Dana. Reef.
A. parvi-rostris Dana. Reef.
A. strenuus Dana. Reef.

STATION 96. South-east side of Pearl-bank, Sulu-archipelago. Dredged on Lithothamnion-bank in about 12 m. depth.

Syn. fossor (Paulson) var. *propinqua* de Man.
Syn. neomeris (de Man).
Syn. Pescadorensis Cout.

A. collumianus Stimps.
A. consobrinus de Man.
A. Coutierei de Man.
A. malleodigitus (Sp. Bate).
A. pareuchirus Cout. var. *Leucothea* de Man.

STATION 99. 6° 7'.5 N., 120° 26' E. Anchorage off North-Ubian, Sulu-archipelago. Dredged on Lithothamnion-bank in about 16 m. depth. (Except *A. pareuchirus* Cout. var. *Leucothea* de Man).

Syn. carinatus (de Man) var. *ubianensis* de Man.
Syn. neomeris (de Man).

A. Alcyone de Man.
A. bicostatus de Man.
A. crassimanus Heller.
A. malleodigitus (Sp. Bate) var. *gracilicarpus* de Man.
A. Miersi Cout.
A. pachychirus Stimps.
A. paralcyone Cout.
A. pareuchirus Cout.
A. pareuchirus Cout. var. *Leucothea* de Man. Taken at the surface of the Sea.

STATION 104. Sulu-harbour, Sulu-island. Caught on a bottom of sand, 14 m. deep.

A. Hippothoë de Man.

STATION 109. Anchorage off Pulu Tongkil, Sulu-archipelago. Caught on a Lithothamnion-bottom, 13 m. deep.

A. pareuchirus Cout.

STATION 114. 0° 58'.5 N., 122° 55' E. Kwandang-bay-entrance. Dredged on a bottom of very fine, hard sand in a depth of 75 m.

A. lepidus de Man.
A. proseuchirus de Man.
A. tenuicarpus de Man.

STATION 115. East side of Pajunga-island, Kwandang-bay, Celebes. Coralreef.

Syn. hastilicrassus Cout.

A. chiragricus H. M.-Edw.
A. consobrinus de Man.
A. edamensis de Man.
A. facetus de Man.
A. frontalis H. M.-Edw.
A. gracilipes Stimps.
A. malleodigitus (Sp. Bate).
A. spongiarum Cout.

STATION 116. 0° 58'.5 N., 122° 42'.5 E. West of Kwandang-bay-entrance, North Celebes. Dredged on fine sand with mud in 72 m. depth.

Syn. Iocasta de Man.

A. acutocarinatus de Man.
A. proseuchirus de Man.

STATION 125. Anchorage off Sawan, Siau-island. Reef and stony bottom with some Lithothamnion.

A. acuto-femoratus Dana. Reef.
A. collumianus Stimps. Caught in 31 m. depth on a stony bottom with some Lithothamnion.
A. consobrinus de Man. Reef.
A. Lutini Cout. Reef.
A. microstylus (Sp. Bate). Reef.
A. parvi-rostris Dana. Reef.

STATION 127. Taruna-bay, Great Sangir-island. Coralreef.

A. chiragricus H. M.-Edw.

STATION 129. Anchorage off Kawio- and Kamboling-islands, Karkaralong-group.

Syn. paraneomeris Cout. var. *praedabundus* de Man. On coralreef.

A. ventrosus H. M.-Edw. Caught on a bottom of sand in a depth of 23—31 m.

STATION 131. Anchorage off Beo, Karakelang-islands. Reef.

A. Audouini Cout.
A. bidens (Oliv.).
A. frontalis H. M.-Edw.
A. parvi-rostris Dana.

STATION 133. Anchorage off Lirung, Salibabu-island.

Syn. neptunus (Dana). Dredged on mud and hard sand in about 30 m. depth.

A. bidens (Oliv.). Reef.
A. edamensis de Man. Reef.
A. frontalis H. M.-Edw. 6 young specimens collected on the reef and 1 that was dredged on mud and hard sand in about 30 m. depth.
A. pachychirus Stimps. Reef.
A. pacificus Dana. Reef.
A. paralcyone Cout., *A. parvus* de Man, *A. rapacida* de Man, *A. spongiarum* Cout. Dredged on mud and hard sand in about 30 m. depth.

STATION 142. Anchorage off Laiwui, coast of Obi Major. Coralreef.

A. barbatus Cout.
A. malleodigitus (Sp. Bate).

STATION 144. Anchorage north of Salomakiëe-(Damar-)island.

Syn. Iocasta de Man. Dredged on Lithothamnion-bank in about 6 m. depth.
Syn. streptodactylus Cout. On coralreef.
Syn. Theophane de Man. On coralreef.

A. Lutini Cout. Reef.
A. microstylus (Sp. Bate). Reef.
A. pacificus Dana. Reef.
A. paralcyone Cout. Dredged on a bottom of coral and Lithothamnion in about 6 m. depth
A. ventrosus H. M.-Edw. Reef.

STATION 149. Fau-anchorage and lagune. West coast of Gebé-island. Reef.

A. acuto-femoratus Dana.
A. malleodigitus (Sp. Bate).

STATION 152. Wunoh-bay, N. W.-coast of Waigeu-island. On coralreef.

Syn. hilarulus de Man.
Syn. paraneomeris Cout. var. *halmaherensis* de Man.
Syn. paraneomeris Cout. var. *prolatus* Cout.

A. collumianus Stimps.
A. gracilipes Stimps.
A. parvi-rostris Dana.
A. Stanleyi Cout. var. *dearmatus* de Man.

STATION 153. 0° 3'.8 N., 130° 24'.3 E. Halmahera Sea. Dredged at a depth of 141 m. on a bottom of fine and coarse sand with dead shells.

A. pareuchirus Cout. var. *imitatrix* de Man.

STATION 154. 0° 7'.2 N., 130° 25'.5 E. Bougainville-Strait. Dredged at a depth of 83 m., depth diminishing during haul till 59 m. and bottom changing from grey muddy sand to shells and Lithothamnion.

Syn. Antenor de Man.

A. bidens (Oliv.).
A. Eulimene de Man.
A. gracilipes Stimps.
A. Hailstonei Cout. var. *laetabilis* de Man.

STATION 162. Between Loslos and Broken-islands, West coast of Salawatti. Dredged on coarse and fine sand with clay and shells, 18 m. deep.

Syn. neptunus (Dana).

A. chiragricus H. M.-Edw.
A. pareuchirus Cout. var. *imitatrix* de Man.
A. pubescens de Man.

STATION 163. Anchorage near Seget, West-entrance Selee (Galewo-)strait. Reef.

A. chiragricus H. M.-Edw.

STATION 164. 1° 42'.5 S., 130° 47'.5 E. Bank between Misool and New-Guinea. Haul of the dredge on sand with stones and shells at a depth of 32 m. brought up an enormous amount of animals, especially different species of sponges of large size, big specimens of *Spongodes*, who gave shelter to the specimens of *Synalpheus* and *Alpheus*.

Syn. acanthitelsonis Cout.
Syn. Antenor de Man.
Syn. bituberculatus de Man.
Syn. Demani Borr.
Syn. fossor (Paulson) var. *propinqua* de Man.
Syn. Gravieri Cout.
Syn. hastilicrassus Cout.
Syn. Iocasta de Man.
Syn. neomeris (de Man).
Syn. quadrispinosus de Man.
Syn. streptodactylus Cout.
Syn. Theano de Man.

A. paralcyone Cout.
A. pareuchirus Cout.
A. pareuchirus Cout. var. *imitatrix* de Man.

STATION 169. Anchorage off Atjatuning, West coast of New Guinea. Reef.

A. pacificus Dana.

STATION 174. Waru-bay, North coast of Ceram. Reef.

A. Audouini Cout.

STATION 176. Anchorage off Lilintah, South coast of Misool. Reef.

A. chiragricus H. M.-Edw.
A. crassimanus Heller.

STATION 181. Ambon-anchorage.

Syn. carinatus (de Man). Reef.

A. Audouini Cout. Reef.
A. chiragricus H. M.-Edw. Reef.
A. edamensis de Man. Reef.
A. praedator de Man. Reef.
A. strenuus Dana. Caught on a bottom of mud, sand and coral in about 20 m. depth.

STATION 184. Anchorage off Kampong Kelang, South coast of Manipa-island. Dredged on coral and sand at a depth of 36 m.

Syn. bituberculatus de Man.

STATION 193. Sanana-bay, East coast of Sula Besi. Reef.

A. macrochirus Richters.
A. pacificus Dana.

STATION 204. 4° 20′ S., 122° 58′ E. Between Islands of Wowoni and Buton. Dredged on sand with dead shells at a depth from 75 till 94 m.

Syn. Iocasta de Man.

A. tenuipes de Man.

STATION 205. Buton-strait, between floating seaweed.

A. bicostatus de Man.

STATION 209. Anchorage off the south point of Kabaëna-island. On coralreef (except *A. gracilipes* Stimps.).

Syn. Charon (Heller).
Syn. paraneomeris Cout. var. *prolatus* Cout.
Syn. tumidomanus (Paulson).

A. collumianus Stimps.
A. frontalis H. M.-Edw.
A. gracilipes Stimps. Dredged on a bottom of coarse sand at a depth of 22 m.
A. pacificus Dana.

STATION 213. Saleyer-anchorage and Surroundings.

Syn. consobrinus de Man. On coralreef.
Syn. streptodactylus Cout. On coralreef.

A. Audouini Cout.
A. consobrinus de Man.
A. crassimanus Heller.
A. frontalis H. M.-Edw.
A. malleodigitus (Sp. Bate).
A. strenuus Dana.
} On coralreef.

A. malabaricus (Fabr.) Henderson var. *leptopus* de Man. Caught between 18 and 45 m. depth on a bottom of mud and mud with sand.
A. paralcyone Cout. Captured between 9 and 34 m. depth on a bottom of mud and mud with sand.
A. ventrosus H. M.-Edw. Caught in a depth up to 36 m. on mud and mud with sand.

STATION 220. Anchorage off Pasir Pandjang, West coast of Binongka.

Syn. carinatus (de Man) var. *binongcensis* de Man. Dredged in 55 m. depth, close to the coralreef.
Syn. carinatus (de Man) var. *ubianensis* de Man. On coralreef.

A. frontalis H. M.-Edw. On coralreef.
A. parvi-rostris Dana. On coralreef.

STATION 225. 5700 m. N. 279° E. from South point of South-Lucipara-island. On coralreef.

A. gracilis Heller var. *luciparensis* de Man.

STATION 225°. South-Lucipara-island. On coralreef.

A. pacificus Dana.
A. strenuus Dana.

STATION 231. Ambon-anchorage. On coralreef.

A. pacificus Dana.

STATION 234. Nalahia-bay, Nusa-Laut-island. Caught at a depth of 46 m. on a stony bottom.

A. pacificus Dana.
A. rapax Fabr.

STATION 240. Banda-anchorage.

Syn. modestus de Man. On coralreef.
Syn. amabilis de Man.
Syn. Antenor de Man.
Syn. bispinosus de Man.
Syn. Gravieri Cout.
Syn. Iocasta de Man.
Syn. Iphinoë de Man.
Syn. Nilandensis Cout.
Syn. Nilandensis Cout. var. *bandaensis* de Man.
Syn. streptodactylus Cout.
} Dredged on a Lithothamnion bank in 18—36 m. depth or on sponges which were caught by diving.

A. pacificus Dana. On coralreef.
A. ventrosus H. M.-Edw. On coralreef.
A. collumianus Stimps.
A. Hailstonei Cout. var. *laetabilis* de Man.
A. Miersi Cout.
A. paralcyone Cout.
A. Philoctetes de Man.
A. Stanleyi Cout. var. *dearmatus* de Man.
} Dredged on a Lithothamnion bank in 18—36 m. depth or on sponges which were caught by diving.

A. bidens (Oliv.).
A. frontalis H. M.-Edw.
A. Polyxo de Man.
} Caught between 9 and 45 m. on black sand, coral and Lithothamnion bank in 18—36 m.

STATION 250. Anchorage off Kilsuin, West coast of Kur-island.

Syn. paraneomeris Cout. var. *praedabundus* de Man. On coralreef.
Syn. hastilicrassus Cout. Dredged on a Lithothamnion bank at a depth of 27 m.
A. frontalis H. M.-Edw. Dredged on coral and Lithothamnion at a depth of 27 m.
A. leviusculus Dana. Reef.
A. paralcyone Cout. Dredged on coral and Lithothamnion at a depth of 27 m.

STATION 258. Tual-anchorage, Kei-islands. Dredged on Lithothamnion bottom in about 5—10 m. depth.

Syn. Gravieri Cout.
Syn. neomeris (de Man).
Syn. streptodactylus Cout.
A. strenuus Dana.

STATION 260. 5° 36'.5 S., 132° 55'.2 E. Near Nuhu Jaan, Kei-islands. Dredged on sand, with coral and shells in 90 m. depth.

Syn. Gravieri Cout.
Syn. hastilicrassus Cout.
Syn. odontophorus de Man.
A. Hailstonei Cout. var. *assimulans* de Man.
A. leptochiroides de Man.
A. pareuchirus Cout.

STATION 261. Elat, West coast of Great Kei-island. Reef.

A. frontalis H. M.-Edw.
A. parvi-rostris Dana.

STATION 273. Anchorage off Pulu Jedan, East coast of Aru-islands. Most of the specimens were caught on sponges, between Gorgonids, Algae and on pearl oysters brought up by divers from the sandy bottom of the "Pearl-bank".

Syn. acanthitelsonis Cout.
Syn. amboinae (Zehntner).
Syn. ancistrorhynchus de Man.
Syn. bituberculatus de Man.
Syn. fossor (Paulson) var. *propinqua* de Man.
Syn. Iocasta de Man.
Syn. jedanensis de Man.
Syn. Pococki Cout.
Syn. quadrispinosus de Man.
Syn. streptodactylus Cout.
A. euchirus Dana.
A. facetus de Man.
A. pubescens de Man.
A. spongiarum Cout.

STATION 274. 5° 28'.2 S., 134° 53'.9 E. Near Aru-islands. Dredged on sand with shells in 57 m. depth.

Syn. Iocasta de Man.
A. pareuchirus Cout.

STATION 279. Rumah-Kuda-bay, Roma-island. Dredged on mud and sand in 36 m. depth.

Syn. Gravieri Cout.
Syn. Iphinoë de Man.
A. paradentipes Cout.
A. rapacida de Man.

STATION 282. 8° 25'.2 S., 127° 18'.4 E. Anchorage between Nusa Besi and the N.E.-point of Timor. Dredged in the small channel between Timor and the island of Nusa Besi on a sandy bottom with coral and Lithothamnion between 27 and 50 m. depth. A very strong tidal stream is running between the two islands.

Syn. amboinae (Zehntner).
Syn. bituberculatus de Man.
Syn. biunguiculatus (Stimpson) Cout.
Syn. carinatus (de Man).
Syn. consobrinus de Man.
Syn. fossor (Paulson) var. *propinqua* de Man.
Syn. gracilirostris de Man.
Syn. hastilicrassus Cout.
Syn. Iocasta de Man.
Syn. miscellaneus de Man.
Syn. neptunus (Dana).
Syn. Nilandensis Cout. var. *oxyceros* Cout.
Syn. Pescadorensis Cout.
Syn. quadridens de Man.
Syn. streptodactyloides de Man.
Syn. streptodactylus Cout.
Syn. Theophane de Man.
Syn. tumidomanus (Paulson).
A. Alcyone de Man.
A. bidens (Oliv.).
A. collumianus Stimps.
A. Coutierei de Man.
A. frontalis H. M.-Edw.
A. Hailstonei Cout. var. *assimulans* de Man.
A. Hailstonei Cout. var. *laetabilis* de Man.
A. malleodigitus (Sp. Bate) var. *gracilicarpus* de Man.
A. paraculeipes Cout.
A. paralcyone Cout.
A. ventrosus H. M.-Edw.

STATION 285. 8° 39'.1 S., 127° 4'.4 E. South coast of Timor. Dredged on the limit between mud, coral and Lithothamnion in 34 m. depth.

Syn. hastilicrassus Cout.
Syn. Iocasta de Man.
A. Alcyone de Man.
A. frontalis H. M.-Edw.
A. Hailstonei Cout. var. *laetabilis* de Man.

STATION 289. 9° 0'.3 S., 126° 24'.5 E. South coast of Timor. Caught with the trawl on a muddy bottom with sand and shells in 112 m. depth.

Syn. odontophorus de Man.
Syn. triacanthus de Man.

STATION 299. 10° 52'.4 S., 123° 1'.1 E. Buka- or Cyrus-bay, South-coast of Rotti-island. Dredged on muddy bottom with coral and Lithothamnion in about 15 to 20 m. depth.

Syn. biunguiculatus (Stimpson) Cout.
Syn. hastilicrassus Cout.
Syn. neomeris (de Man).
A. Alcyone de Man.
A. chiragricus H. M.-Edw.
A. collumianus Stimps.
A. consobrinus de Man.
A. euchirus Dana.

STATION 301. 10° 38' S., 123° 25'.2 E. Pepela-bay, East coast of Rotti-island.

Syn. neptunus (Dana). Dredged on muddy bottom with coral and Lithothamnion between 18 and 45 m. depth.

A. frontalis H. M.-Edw. Reef.
A. pacificus Dana. Reef.

STATION 303. Haingsisi, Samau-island near Timor. Dredged on Lithothamnion bottom in about 10 m. depth., the depth sometimes increasing up to 36 m.

Syn. amboinae (Zehntner).
Syn. bituberculatus de Man.
A. Arethusa de Man.
A. Hailstonei Cout. var. *laetabilis* de Man.
A. paralcyone Cout.
A. pareuchirus Cout.
A. pubescens de Man.

STATION 305. Mid-channel in Solor-strait off Kampong Menanga. Dredged on stony bottom cleaned by the very strong tidal current in 113 m. depth.

Syn. consobrinus de Man.
Syn. hastilicrassus Cout. var.?
Syn. Iocasta de Man.

A. Hailstonei Cout. var. *assimulans* de Man.
A. paralcyone Cout.
A. pareuchirus Cout. var. *imitatrix* de Man.
A. Sibogae de Man.
A. spongiarum Cout.

STATION 310. 8° 30′ S., 119° 7′.5 E. Sapeh-Strait.

A haul with the dredge on sand with a few pieces of coral in 73 m. depth. It lasted only 20 minutes on account of the very strong current, but it was very rich especially in an enormous quantity of sponges.

Syn. Gravieri Cout.
Syn. hastilicrassus Cout. var.?
Syn. Iocasta de Man.
Syn. quadrispinosus de Man.
Syn. streptodactylus Cout.

A. Hailstonei Cout. var. *laetabilis* de Man.

STATION 311. Sapeh-bay, East coast of Sumbawa.

A. barbatus Cout. Reef.
A. chiragricus H. M.-Edw. Reef.
A. acutocarinatus de Man.
A. malabaricus (Fabr.) Henderson var. *leptopus* de Man.
A. tenuicarpus de Man.

Dredged in a depth up to 36 m. on a bottom of mud and sand.

STATION 313. Anchorage East of Dangar Besar, Saleh-bay.

A. euchirus Dana. Reef.
A. frontalis H. M.-Edw. Reef.
A. rapacida de Man. Caught in a depth up to 36 m. on a bottom of sand, coral and mud.

STATION 315. Anchorage East of Sailus Besar, Paternoster-islands. Dredged on coral and Lithothamnion in a depth up to 36 m.

Syn. bituberculatus de Man.
Syn. carinatus (de Man).
Syn. Demani Borr.
Syn. fossor (Paulson) var. *propinqua* de Man.
Syn. Gravieri Cout.
Syn. quadrispinosus de Man.
Syn. septemspinosus de Man.
Syn. streptodactylus Cout.

A. consobrinus de Man.
A. pachychirus Stimps.

STATION 320. 6° 5′ S., 114° 7′ E. Java Sea.

Caught in haul with the trawl on fine, grey mud in 82 m. depth.

Syn. neomeris (de Man).

STATION 322. 1 1/2 mile south of Tandjong Lajar, South coast of Bawean-island. Dredged in a depth of 32 m. on a bottom of coral.

A. euchirus Dana.

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ADDENDA ET CORRIGENDA.

Page 174, line 4, for "slightlye marginate" read "slightly emarginate".
Page 333, line 13, for "Saleyer" read "Tanah Djampeah".
Page 340, line 16 from bottom, for "1877" read "1880".
Page 389, line 16 from bottom, for "1898" read "1908".
Page 393, line 9 from bottom, for "1898, p. 166." read "1898, N^{0} 7, p. 166".
Page 418, line 10 from bottom, for "April 27/28" read "February 2/5".
Pages 276, 352, 355 and 389. The specimens of *Syn. tuberculatus* de Man, *A. Arethusa* de Man, *A. paralcyone* Cout. and *A. pubescens* de Man, which are enumerated as having been collected at Stat. 60, are not from this Station, but from Stat. 303, having been dredged February 2/5 on a Lithothamnion bottom in about 10 m. depth at Haingsisi, Samau-Island near Timor.

In Part I Family Penaeidae *Penaeus Bocagei* Johnson has been omitted and should be inserted in the List at page 10 as: "*Penaeus Bocagei* Johnson 1863. Coast of Portugal". This species, which bears the vulgar name of Camarão da costa and which abundantly occurs on the coast of Portugal, belongs according to Professor COUTIÈRE to the edible species of Crustacea and is actively fished (H. COUTIÈRE, in: Bull. Soc. Nat. d'Acclimatation de France, Paris 1909). My contention at page 95 of Part I that, besides *P. caramote*, only two other species of *Penaeus* occur in the Atlantic, is therefore erroneous, three species being found there besides RISSO's *Penaeus*.

EXPLANATION OF THE PLATES.

The Plates of the Alpheidae have been drawn by Mr. J. F. OBBES of Apeldoorn under my supervision, with the exception of the following that have been drawn by myself:

Ogyris Sibogae
Automate sp.
Automate anacanthopus
Athanas parvus
Athanas tenuipes
Synalpheus streptodactyloides
Alpheus parvus
Alpheus Philoctetes
Alpheus tenuipes
Alpheus leptochiroides.

PLATE I.

Fig. 1. *Ogyris Sibogae* de Man, frontal and antennal region of the type from Stat. 102, × 17; 1*a* telson of the same, × 17; 1*b*, 1*c*, 1*d* legs of the 1st, 2nd and 3rd pair, on the left side, of the same type, × 10; 1*e* frontal and antennal region of the specimen from Stat. 313, × 17; 1*f* right leg of the 4th pair, 1*g* of the 5th pair of the specimen from Stat. 313, × 10; 1*h* dactylus of the 5th leg of this specimen, × 25.

Fig. 2. *Automate* sp., frontal and antennal region of the female from Stat. 86, × 25; 2*a* telson of this specimen, × 25; 2*b* right leg of the 3rd pair of the same female, × 25; 2*c* telson of the larger female from Stat. 19, × 25; 2*d* right leg of the 3rd pair of this female, × 25.

Fig. 3. *Automate anacanthopus* de Man, frontal and antennal region of the specimen from Stat. 193, × 25 (the missing parts of the right antennular peduncle are drawn according to the left); 3*a* telson of the specimen from Stat. 114, × 25; 3*b* merus, 3*c* carpus and chela of the small cheliped of this specimen, looked at from the inner side, × 33; 3*d* leg of the 3rd pair of the specimen from Stat. 193, × 25 (A spine at the distal extremity of the lower margin of the propodus which was overlooked in the description, is distinctly visible!).

Fig. 4. *Athanas parvus* de Man, frontal and antennal region of the type, × 50; 4*a* lateral view of the same, × 50 (the extra-corneal spine does not extend beyond the eye by half its length, but only by one-fourth); 4*b* leg of the 1st pair, × 50; 4*c* leg of the 2nd pair, × 50; 4*d* leg of the 3rd pair, × 50.

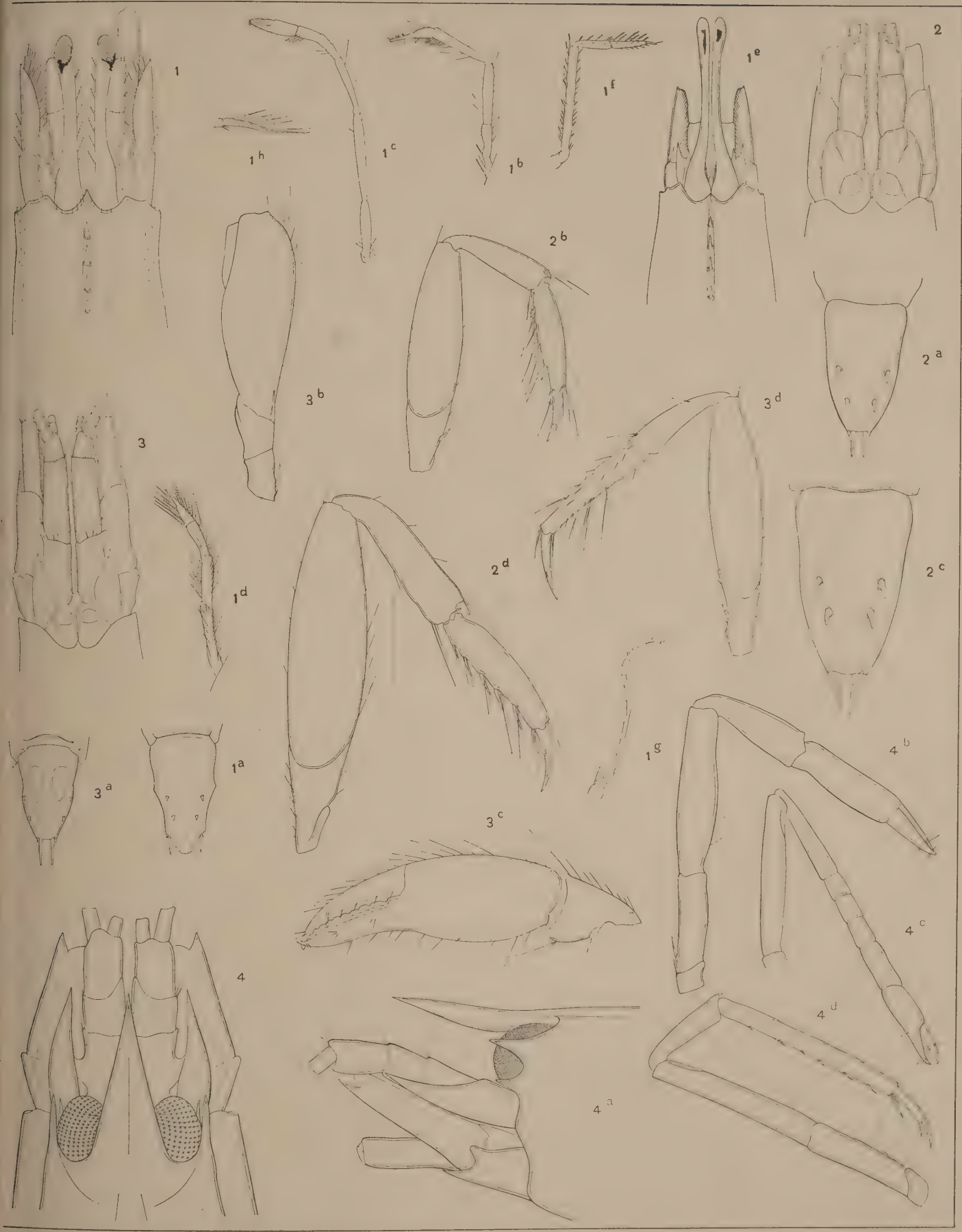

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PLATE II.

Fig. 5. *Athanas Minikoensis* Cout., frontal and antennal region of the female from Stat. 125, × 30; 5*a* lateral view of this region, × 30; 5*b* left and 5*c* right leg of the 1st pair of the male from Stat. 169, × 20, both legs seen from the lower side; 5*d* right, 5*e* left leg of the 1st pair of the female, seen from the lower side, × 20; 5*f* leg of the 2nd pair of the male, × 20; 5*g* leg of the 3rd pair of the male, × 20; 5*h* telson of the male, × 30.

Fig. 6. *Athanas Sibogae* de Man, frontal and antennal region of the male from Stat. 273, the type, × 25; 6*a* lateral view of the same, × 25; 6*b* telson, × 25; 6*c* left, 6*d* right leg of the 1st pair of this male, looked at from the lower side, × 15; 6*e* left leg of the 2nd pair of this male, × 20; 6*f* right leg of the 3rd pair of this specimen, × 20; 6*g* dactylus of this leg, × 50; 6*h* large right leg of the 1st pair of the female from Stat. 162, looked at from the outer side, × 15.

Fig. 7. *Athanas jedanensis* de Man, frontal and antennal region of the male, × 25; 7*a* lateral view of the same, × 25; 7*b* right leg of the 1st pair of this male, × 15; 7*c* left leg of the 1st pair of the largest female, long 12 mm., × 20; 7*d* left leg of the 2nd pair of the female, long 11 mm., × 20; 7*e* left leg of the 3rd pair of this female, × 20; 7*f* dactylus of this leg, × 50.

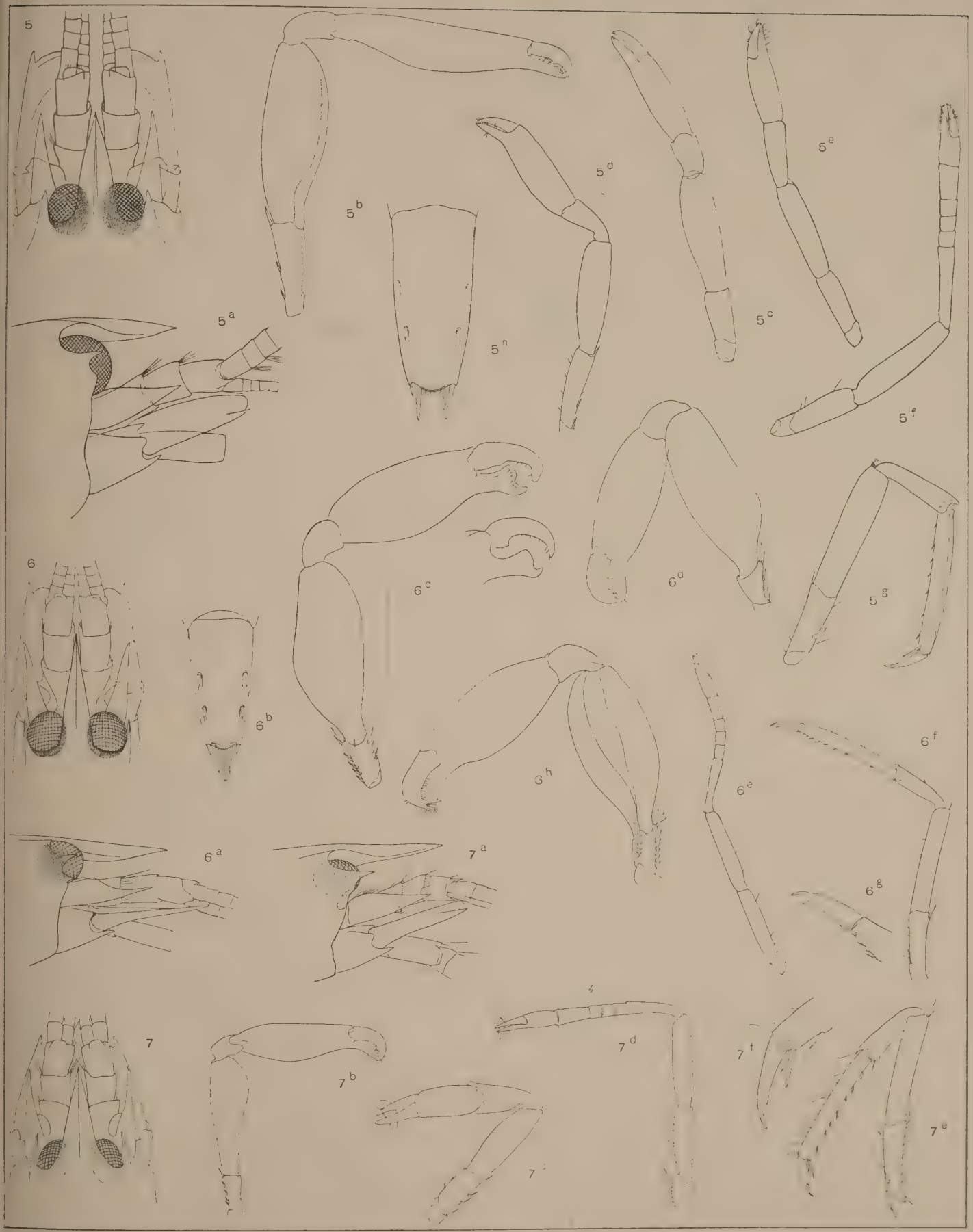

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PLATE III.

Fig. 8. *Athanas tenuipes* de Man, frontal and antennal region of the type, × 50, a the carpocerite; 8*a* lateral view of the same, × 50; 8*b* telson, × 50; 8*c* leg of the 2nd pair, × 40; 8*d* leg of the 3rd pair, × 40; 8*e* leg of the 5th pair, × 40.

Fig. 9. *Jousseaumea Sibogae* de Man, frontal and antennal region of the female from Stat. 225, × 25; 9*a* lateral view of the same, × 25; 9*b* telson, × 25; 9*c* posterior margin of the telson, × 50; 9*d* the large cheliped, from the outer side, as it is borne by the animal, × 15; 9*e* chela looked at from the upper side, × 15; 9*f* leg of the 2nd pair, × 25; 9*g* leg of the 3rd pair, × 25.

Fig. 10. *Jousseaumea hilarula* de Man, frontal and antennal region viewed from above, × 20; 10*a* lateral view of the same, × 20; 10*b* telson, × 25; 10*c* posterior margin of the telson, × 50; 10*d* and 10*e* small cheliped, looked at from two different sides, × 15; 10*f* right leg of the 2nd pair, × 20. 10*g* right leg of the 3rd pair, × 20.

Fig. 11. *Arete Iphianassa* de Man, frontal and antennal region of the male from Stat. 125, looked at from above, × 35.

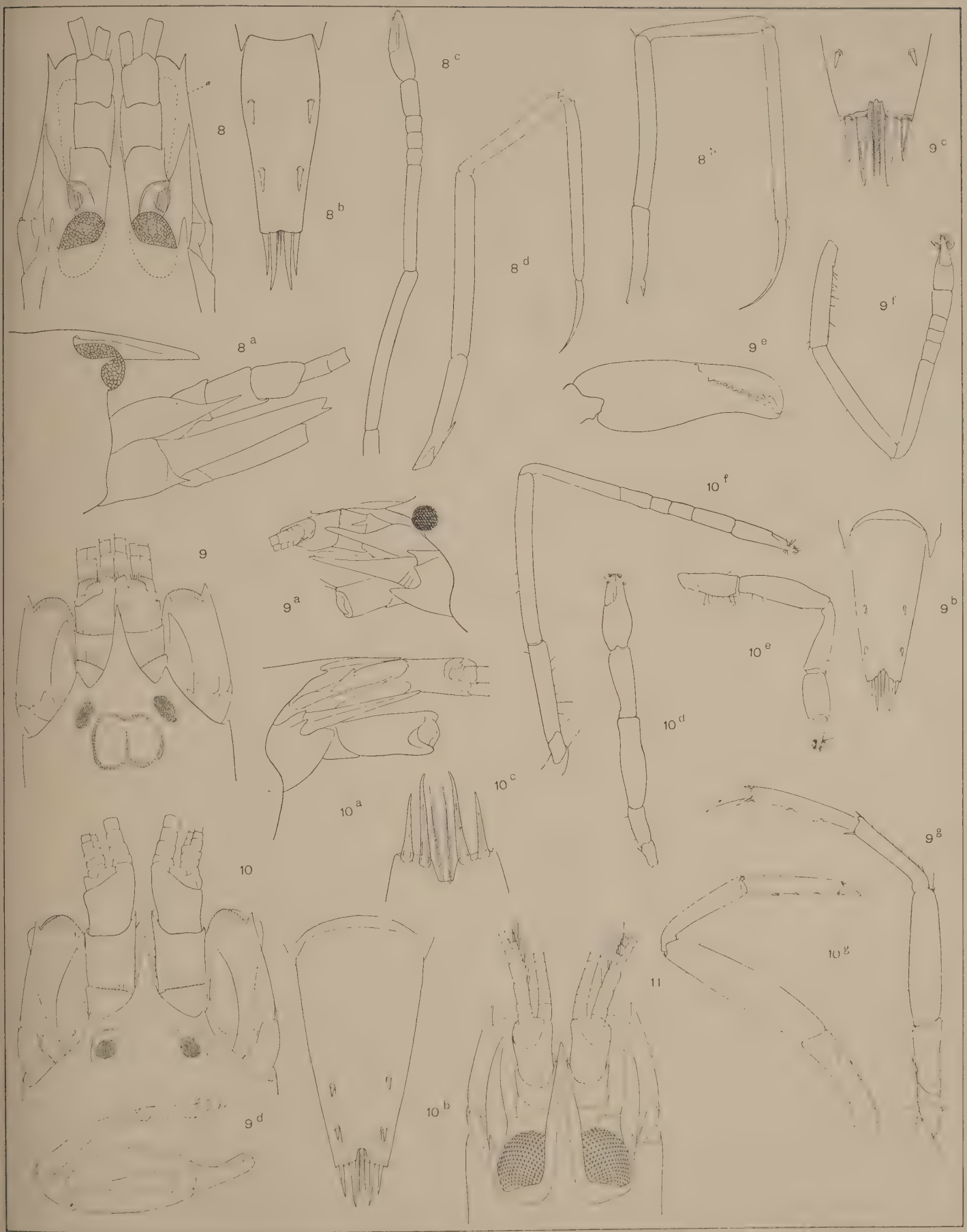

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PLATE IV.

Fig. 11*a*. *Arete Iphianassa* de Man, large, 11*b* small cheliped of the male, viewed from the outer side, × 15; 11*c* large (left) cheliped of the female, × 15; 11*d* leg of the 2nd pair of the male, × 25; 11*e* leg of the 3rd pair of the male, × 25.

Fig. 12. *Arete dorsalis* Stimps., frontal and antennal region of the female from Stat. 213, × 30; 12*a* leg of the 2nd pair of this female, × 30; 12*b* leg of the 3rd pair of this female, × 30; 12*c* leg of the 2nd pair of the adult female from Stat. 78, × 15; 12*d* leg of the 3rd pair of this female, × 15.

Fig. 13. *Arete Maruteensis* Cout., var. *Salibabuensis* de Man, frontal and antennal region, × 35; 13*a* lateral view of the rostrum, × 50; 13*b* cheliped, × 20; 13*c* leg of the 3rd pair, × 20.

Fig. 14. *Aretopsis amabilis* de Man, frontal and antennal region viewed from above, × 25; 14*a* lateral view of the anterior part of the carapace, × 25; 14*b* lateral view of the rostrum, × 50; 14*c* telson, × 25; 14*d* right cheliped, × 15; 14*e* leg of the 2nd pair, × 20; 14*f* leg of the 3rd pair, × 20; 14*g* dactylus of this leg, × 50.

Fig. 15*a*. *Betaeus indicus* de Man, telson, × 15; 15*b* left cheliped as it is borne by the animal, × 10; 15*c* chela looked at in the plane of the fingers, × 10; 15*d* leg of the 2nd pair, × 10; 15*e* leg of the 3rd pair, × 10; 15*f* dactylus of this leg, × 30.

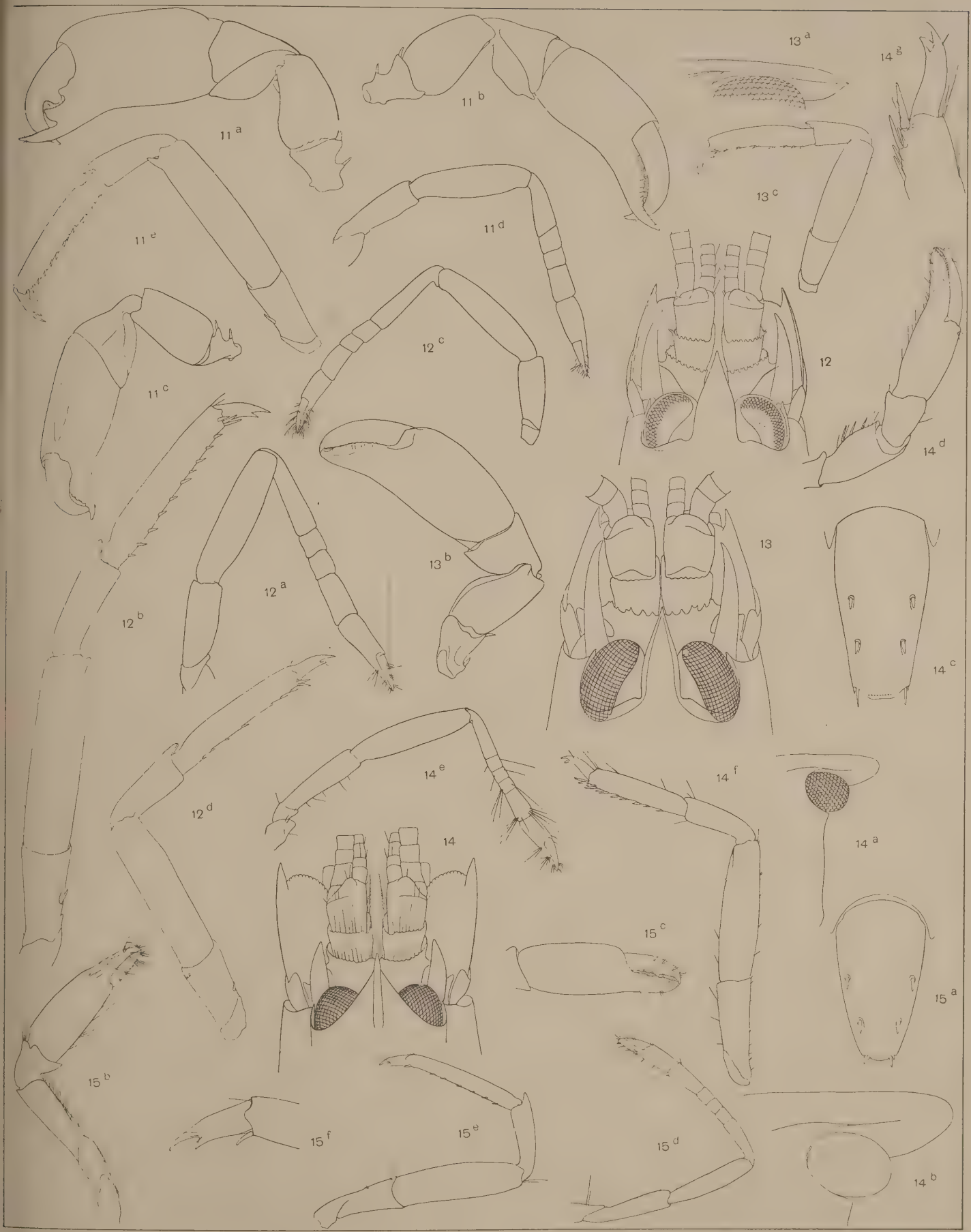

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PLATE V.

Fig. 15. *Betaeus indicus* de Man, frontal and antennal region of the ova-bearing female, × 10.

Fig. 16. *Alpheopsis consobrinus* de Man, frontal and antennal region from above, × 25; 16*a* lateral view of the anterior part of the carapace, × 25; 16*b* telson, × 25; 16*c* left, 16*d* right cheliped, × 20; 16*e* leg of the 2nd pair, × 25; 16*f* leg of the 3rd pair, × 25.

Fig. 17. *Alpheopsis Chalciope* de Man, frontal and antennal region viewed from above, × 25; 17*a* lateral view of the anterior part of the carapace, × 25; 17*b* telson, × 25; 17*c* cheliped, × 20, viewed from the lower side, in the plane of the fingers; 17*d* leg of the 2nd pair, × 20; 17*e* leg of the 3rd pair, × 20.

Fig. 18. *Alpheopsis Sibogae* de Man, frontal and antennal region from above, × 20; 18*a* lateral view of the anterior part of the carapace, × 20; 18*b* telson, × 20; 18*c* left cheliped looked at from the outer side, × 10; 18*d* leg of the 2nd pair, × 10; 18*e* leg of the 3rd pair, × 10; 18*f* dactylus of this leg, × 25.

Fig. 19. *Alpheopsis*? *Euryone* de Man, frontal and antennal region, viewed from above, × 20; 19*a* lateral view of the anterior part of the carapace, × 20; 19*b* telson, × 20; 19*c* leg of the 2nd pair, × 15; 19*d* leg of the 3rd pair, × 15.

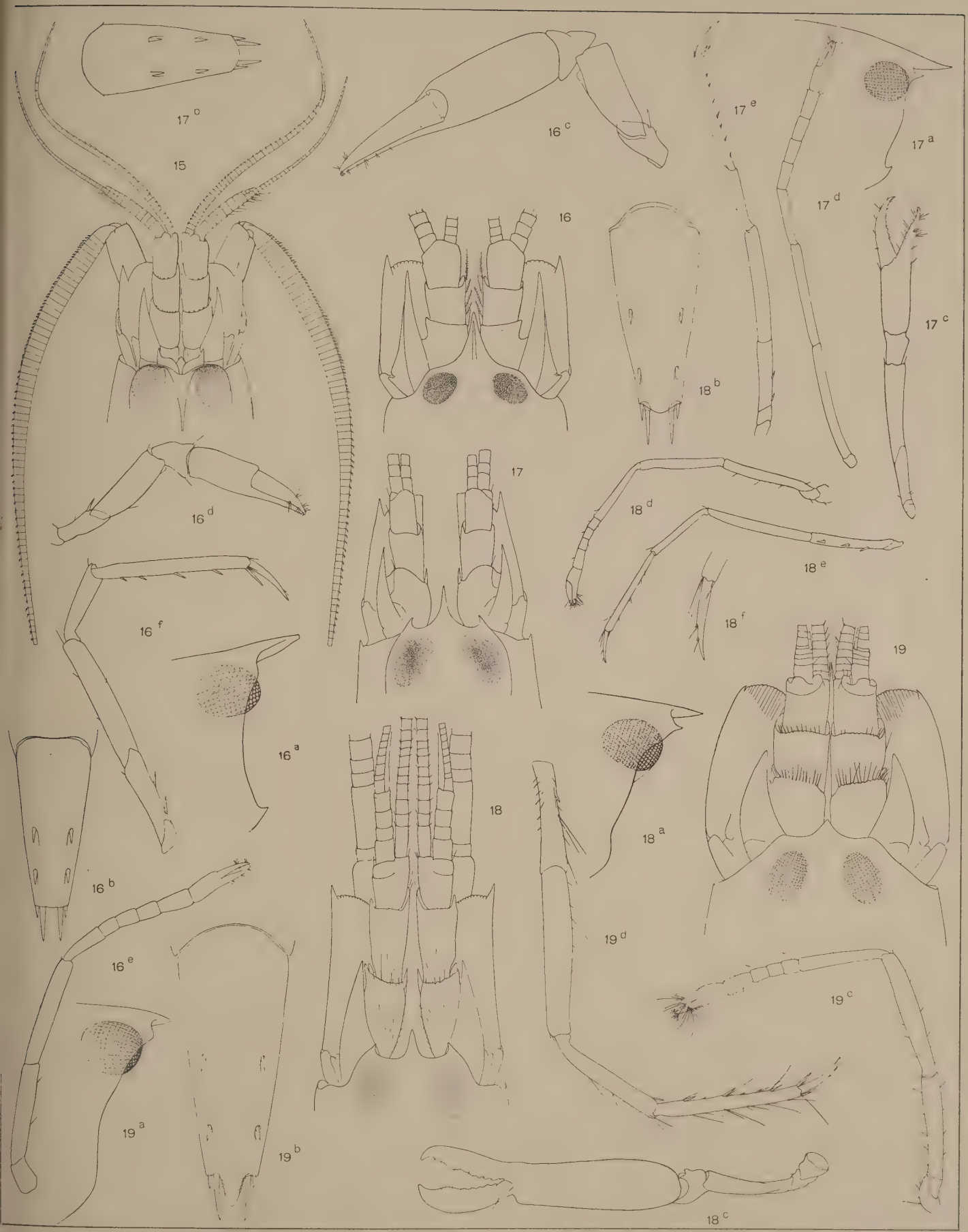

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PLATE VI.

Fig. 20. *Synalpheus amboinae* (Zehntner), frontal and antennal region of the adult specimen from Stat. 303, × 8; 20*a* telson, × 10.

Fig. 21. *Synalpheus consobrinus* de Man, frontal and antennal region of the male from Stat. 213, × 10; 21*a* telson, × 10; 21*b* large cheliped viewed from the inner side, × 4; 21*c* the same, outer side, × 4; 21*d* leg of the 3rd pair, × 8; 21*e* dactylus of this leg, × 25.

Fig. 22. *Synalpheus odontophorus* de Man, frontal and antennal region, × 15; 22*a* telson, × 15; 22*b* large cheliped, viewed from the inner, upper side, × 6; 22*c* chela of this cheliped, outer, lower, side, × 6; 22*d* small cheliped, × 12; 22*e* leg of the 2nd pair, × 15; 22*f* leg of the 3rd pair, × 15; 22*g* dactylus of this leg, × 50. All the figures are taken from the female from Stat. 289.

Fig. 23. *Synalpheus carinatus* (de Man), telson of the adult ova-bearing female from Stat. 181, × 10.

Fig. 23*a*. *Synalpheus carinatus* (de Man) var. *binongcensis* de Man, telson of the ova-bearing female from Stat. 220, × 10.

Fig. 24. *Synalpheus neomeris* (de Man), frontal and antennal region of the adult male from Stat. 99, × 8; 24*a* telson of the adult female from the same Station, being N° 6 of Table A, × 8; 24*b* small chela and carpus of the adult male from Stat. 99, lower side, × 6; 24*c* and 24*d* small chela with the carpus of two adult male specimens from Stat. 258, 24*e* and 24*f* small chela of two adult egg-bearing females from the same Station, × 6.

Fig. 25. *Synalpheus Gravieri* Cout., telson of an egg-bearing female from Stat. 258, this specimen being N° 2 or N° 3 of the Tables of measurements, × 20; 25*a* leg of the 3rd pair of this female, × 20; 25*b* dactylus of this leg, × 50.

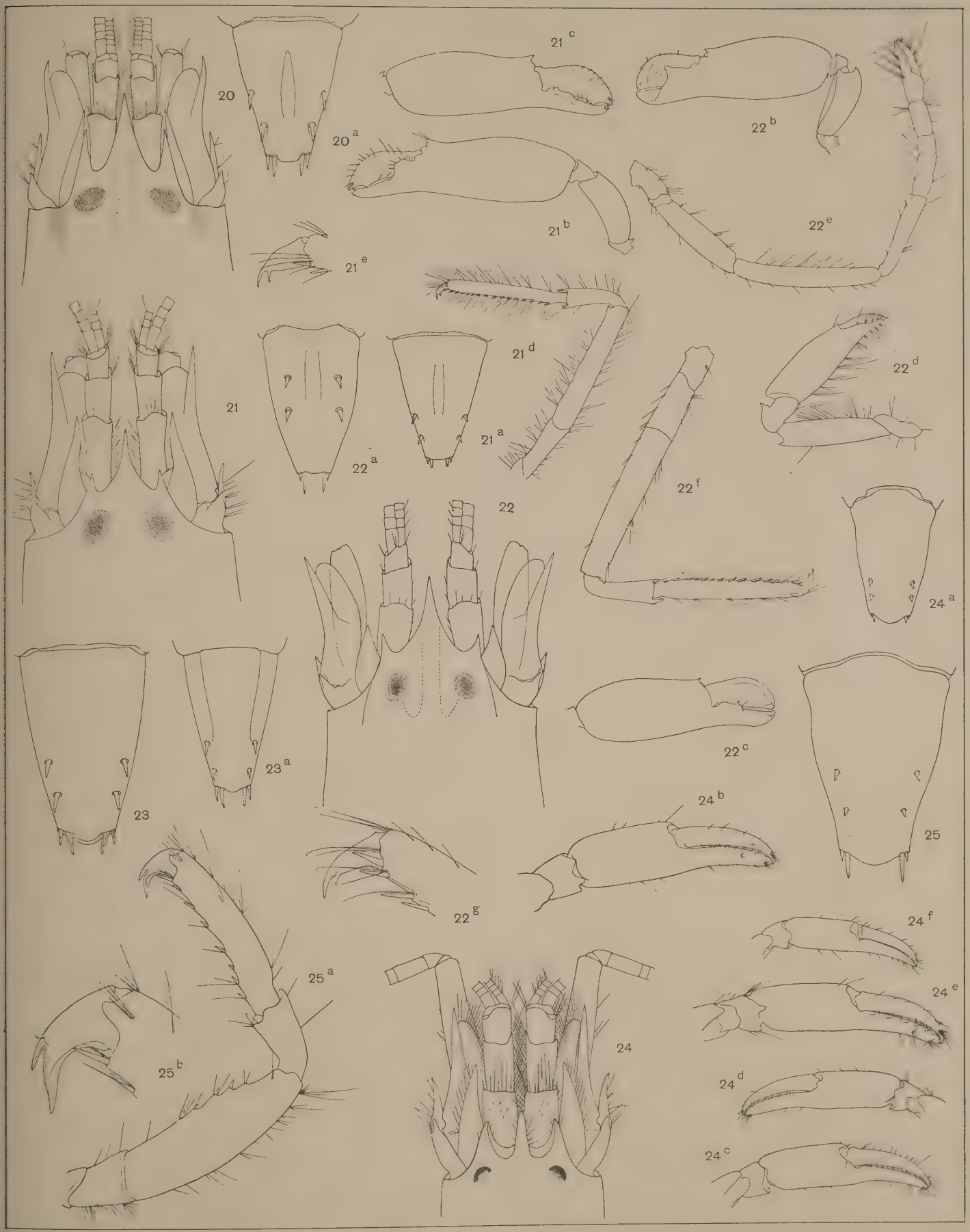

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PLATE VII.

Fig. 26. *Synalpheus Iphinoë* de Man, frontal and antennal region of the male from Banda, × 15; 26*a* telson, × 20; 26*b* small chela and carpus, lower side, × 15; 26*c* leg of the 3rd pair, × 15; 26*d* dactylus of this leg, × 50; 26*e* leg of the 4th pair, × 15 (the figures 26*a*—26*e* are also taken from the Banda male).

Fig. 27. *Synalpheus jedanensis* de Man, male specimen from Stat. 273. — 27 frontal and antennal region, × 15; 27*a* small chela and carpus, lower side, × 15; 27*b* leg of the 3rd pair, × 15; 27*c* dactylus of this leg, × 50.

Fig. 28. *Synalpheus miscellaneus* de Man, frontal and antennal region, × 10; 28*a* telson, × 15; 28*b* small chela with the carpus, lower side, × 15; 28*c* leg of the 3rd pair, × 10; 28*d* dactylus of this leg, × 50.

Fig. 29. *Synalpheus streptodactylus* Cout., telson of the adult female from Stat. 144, × 15; 29*a* telson of an adult female from Stat. 273, × 20; 29*b* small chela with carpus of the female from Stat. 144, lower side, × 15; 29*c* leg of the 3rd pair of this female, × 10; 29*d* dactylus of this leg, × 50; 29*e* leg of the 3rd pair of the female from Stat. 273, × 15; 29*f* dactylus of this leg, × 50; 29*g* dactylus of the 3rd leg of the adult female from Stat. 33, × 50.

Fig. 30. *Synalpheus streptodactyloides* de Man. Type. Frontal and antennal region, × 25; 30*a* telson, × 25; 30*b* small chela, outer side, × 20; 30*c* carpus and chela of the right leg of the 2nd pair, × 25; 30*d* leg of the 3rd pair, × 25; 30*e* dactylus of a leg of the 4th pair, × 50.

Fig. 31. *Synalpheus modestus* de Man, frontal and antennal region, × 15; 31*a* telson, × 20.

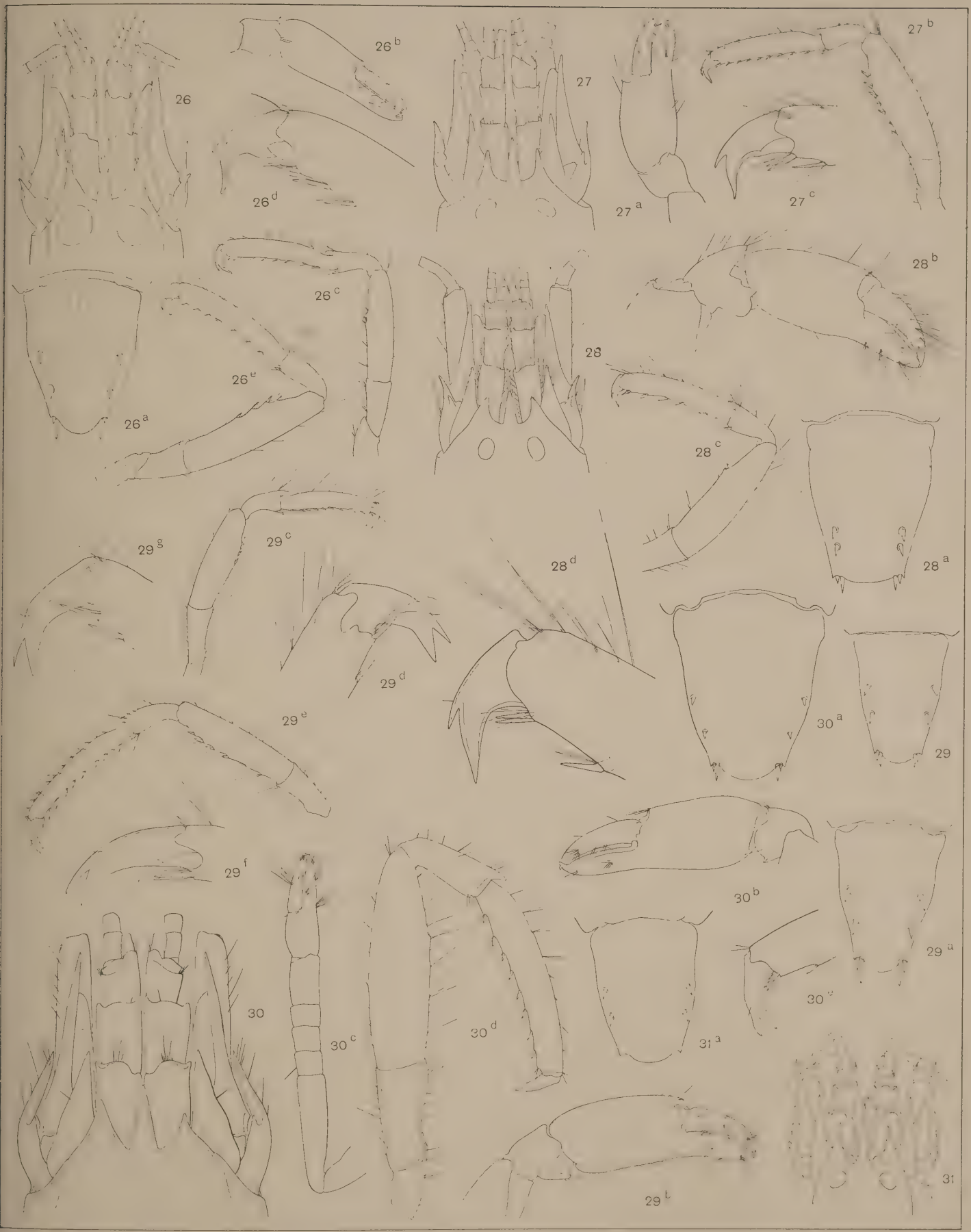

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PLATE VIII.

Fig. 31*b*. *Synalpheus modestus* de Man, leg of the 2nd pair, × 20; 31*c* leg of the 3rd pair, × 20; 31*d* dactylus of this leg, × 50.

Fig. 32. *Synalpheus Pococki* Cout., leg of the 3rd pair of the female from Stat. 273, × 15; 32*a* dactylus of this leg, × 50.

Fig. 33. *Synalpheus Iocasta* de Man, frontal and antennal region of an adult, egg-bearing female from Stat. 164, × 20; 33*a* telson of this female, × 20; 33*b* telson of a female with eggs from Stat. 273, × 20; 33*c* telson of the female with eggs from Stat. 285, × 20; 33*d* small chela and carpus of the adult egg-bearing female from Stat. 164, × 20; 33*e* leg of the 2nd pair of this female, × 15; 33*f* leg of the 2nd pair of an egg-bearing female from Stat. 282, × 15; 33*g* leg of the 3rd pair of the female from Stat. 164, × 20; 33*h* dactylus of this leg, × 50; 33*i* leg of the 3rd pair of the egg-bearing female from Stat. 116, × 20; 33*j* dactylus of this leg, × 50; 33*k* leg of the 3rd pair of the female from Stat. 273, × 20; 33*l* dactylus of this leg, × 50.
(The female from Stat. 164 does not occur in the Tables of measurements).

Fig. 34. *Synalpheus paraneomeris* Cout. var. *praedabundus* de Man, telson of an egg-bearing female from Stat. 129, × 20; 34*a* leg of the 2nd pair, × 15; 34*b* leg of the 3rd pair, × 15; 34*c* dactylus of this leg, × 50.

Fig. 35. *Synalpheus paraneomeris* Cout. var. *prolatus* Cout., frontal and antennal region of the egg-bearing female from Stat. 152, × 20; 35*a* telson, × 20; 35*b* leg of the 2nd pair, × 15; 35*c* dactylus of the leg of the 3rd pair, × 50.

Fig. 36. *Synalpheus paraneomeris* Cout. var. *halmaherensis* de Man, frontal and antennal region of the female from Stat. 152, × 20; 36*a* telson of this female, × 20; 36*b* leg of the 3rd pair of the male, × 15; 36*c* dactylus of this leg, × 50.

Fig. 37. *Synalpheus Charon* (Heller), frontal and antennal region of the specimen from Stat. 209, × 20; 37*a* telson, × 20; 37*b* leg of the 2nd pair, × 15; 37*c* leg of the 3rd pair, × 15.

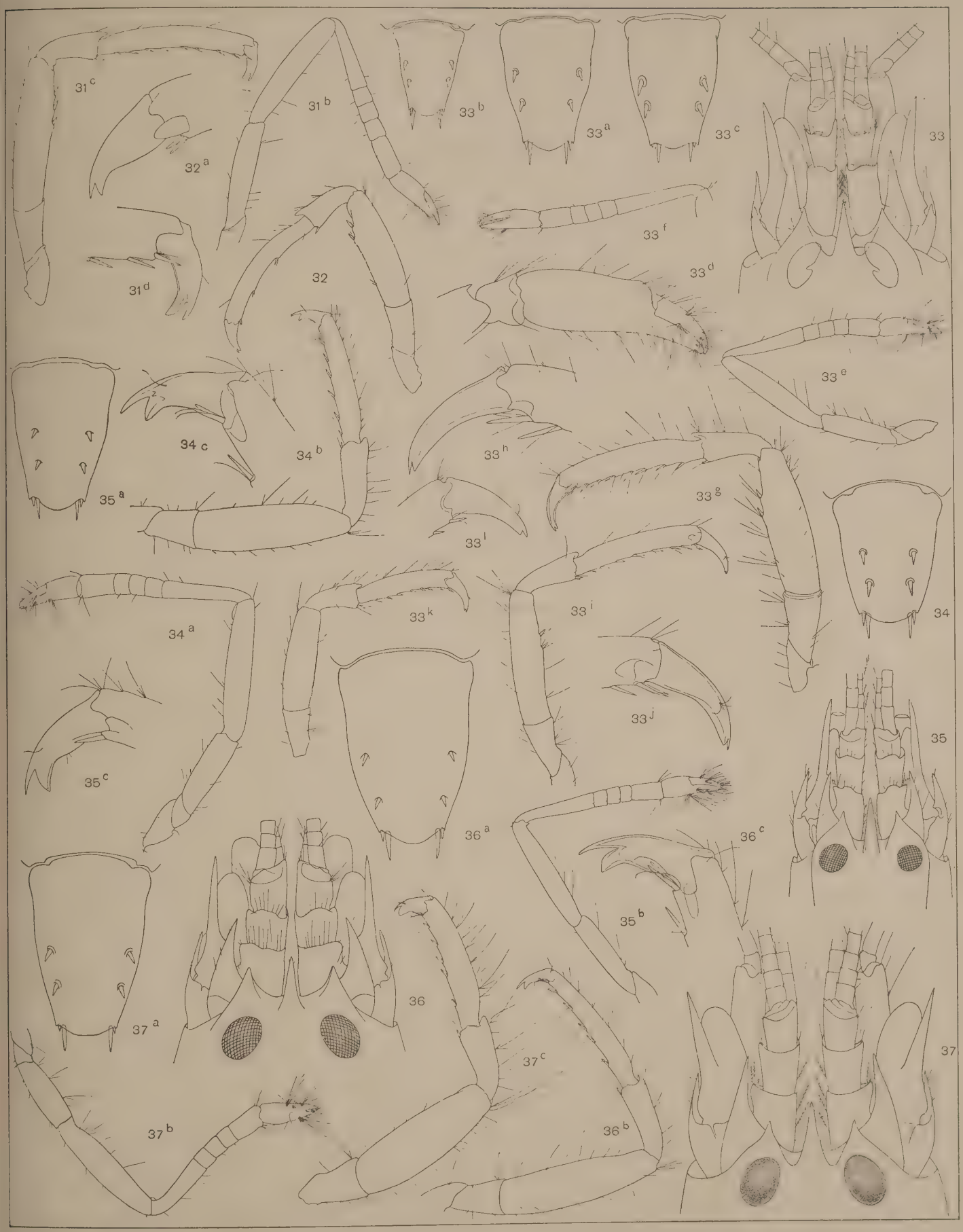

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PLATE IX.

Fig. 38. *Synalpheus Nilandensis* Cout., frontal and antennal region of one of the two specimens from Stat. 51, × 20; 38*a* *Synalpheus Nilandensis* Cout. var. *bandaensis* de Man, leg of the 3rd pair of the specimen without eggs from Stat. 240, × 15; 38*b* dactylus of this leg, × 50; 38*c* *Synalpheus Nilandensis* Cout. var. *oxyceros* Cout., leg of the 4th pair of the female from Stat. 282, × 20; 38*d* dactylus of this leg, × 50.

Fig. 39. *Synalpheus fossor* (Paulson) var. *propinqua* de Man, the ova-bearing female from Stat. 96. — Fig. 39, frontal and antennal region, × 15; 39*a* telson, × 15; 39*b* small chela with carpus, outer side, × 15; 39*c* leg of the 3rd pair, × 15; 39*d* dactylus of this leg, × 50; 39*e* leg of the 4th pair, × 15; 39*f* small chela and carpus of the ova-bearing female from Stat. 282, outer side, × 15.

Fig. 40. *Synalpheus Bakeri* Cout. var. *Stormi* de Man, frontal and antennal region of the adult egg-bearing female from Balikpapan, × 10; 40*a* telson, × 10; 40*b* small chela and carpus, × 10; 40*c* leg of the 3rd pair, × 10; 40*d* dactylus of this leg, × 50; 40*e* leg of the 4th pair of one of the four specimens from Atjeh, long 11 mm., mentioned p. 253 of the text, × 15; 40*f* dactylus of this leg, × 50 [1]).

Fig. 41. *Synalpheus Heroni* Cout., telson of the male from Stat. 66, × 20; 41*a* large chela viewed from the outer, 41*b* from the inner side, × 8; 41*c* leg of the 3rd pair, × 15; 41*d* dactylus of this leg, × 50.

Fig. 42. *Synalpheus Demani* Borr., dactylus of the 3rd leg of the adult female from Stat. 164, × 50.

Fig. 43. *Synalpheus tumidomanus* (Paulson), telson, × 20; 43*a* leg of the 3rd pair, × 15; 43*b* dactylus of this leg, × 50; 43*c* leg of the 3rd pair of the specimen from Stat. 282, × 15; 43*d* dactylus of this leg, × 50.

1) The 3rd leg, measured and described in the text, has been lost, so that now the 4th leg has been figured. The measurements of the 4th leg are: Merus 2, Carpus 1, Propodus 2,1. Merus 4,4-times, propodus 7-times as long as broad.

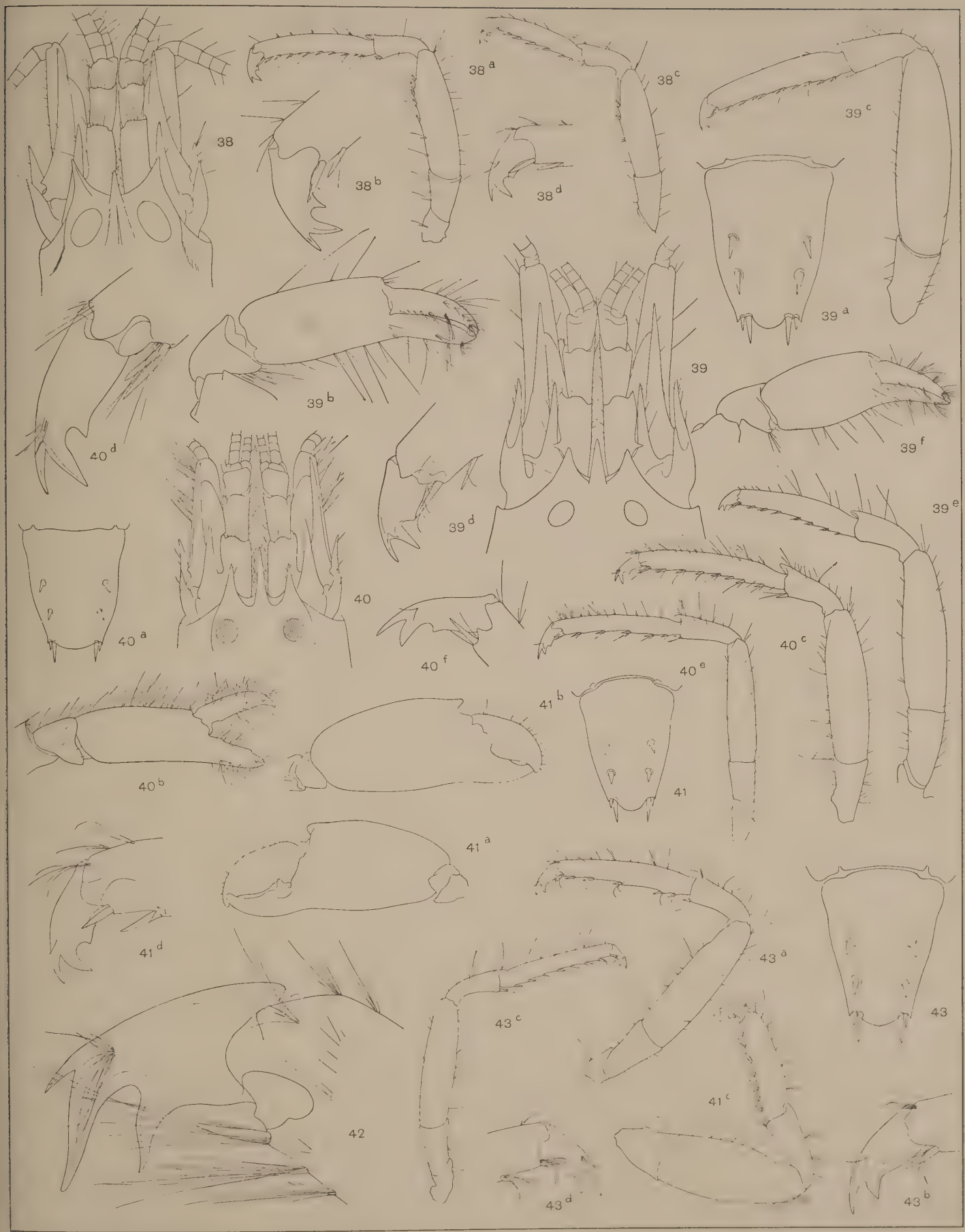

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PLATE X.

Fig. 44. *Synalpheus Theophane* de Man, frontal and antennal region of the largest female with eggs from Stat. 282, × 15; 44*a* telson, × 20; 44*b* small chela viewed from the lower outer side, × 15; 44*c* leg of the 2nd pair, × 15; 44*d* leg of the 3rd pair, × 15; 44*e* dactylus of this leg, × 50.

Fig. 45. *Synalpheus hastilicrassus* Cout., large chela of the male from Stat. 282, × 8; 45*a* leg of the 2nd pair, × 15; 45*b* large chela of the specimen from Stat. 305, described as a variety of this species, viewed from the outer side, × 8.

Fig. 46. *Synalpheus acanthitelsonis* Cout., large chela of an egg-bearing female from Stat. 273, × 8; 46*a* leg of the 2nd pair of a specimen from Stat. 164, × 15; 46*b* leg of the 3rd pair of this specimen, × 15; 46*c* dactylus of this leg, × 50.

Fig. 47. *Synalpheus ancistrorhynchus* de Man, frontal and antennal region, × 15; 47*a* telson, × 30; 47*b* large chela, × 6; 47*c* small chela, × 12; 47*d* leg of the 2nd pair, × 15; 47*e* leg of the 3rd pair, × 15; 47*f* dactylus of this leg, × 50; 47*g* extremity of this dactylus, × 320.

Fig. 48. *Synalpheus Paulsoni* Nob. var. *Rameswarensis* Cout. Specimen, long. 13 mm., from Atjeh. — Fig. 48 frontal and antennal region, × 15; 48*a* telson, × 20; 48*b* carpocerite viewed from the lower side, × 20; 48*c* large chela, × 8; 48*d* small chela, × 12; 48*e* leg of the 2nd pair, × 15; 48*f* leg of the 3rd pair, × 10; 48*g* dactylus of this leg, × 50.

Fig. 49. *Synalpheus gracilirostris* de Man, frontal and antennal region, × 20; 49*a* telson, × 30; 49*b* small chela, × 20; 49*c* leg of the 3rd pair, × 20; 49*d* dactylus of this leg, × 50.

Fig. 50. *Synalpheus hilarulus* de Man, frontal and antennal region, × 15; 50*a* telson, × 20; 50*b* carpocerite viewed from the lower side, × 20; 50*c* leg of the 3rd pair, × 15; 50*d* dactylus of this leg, × 50.

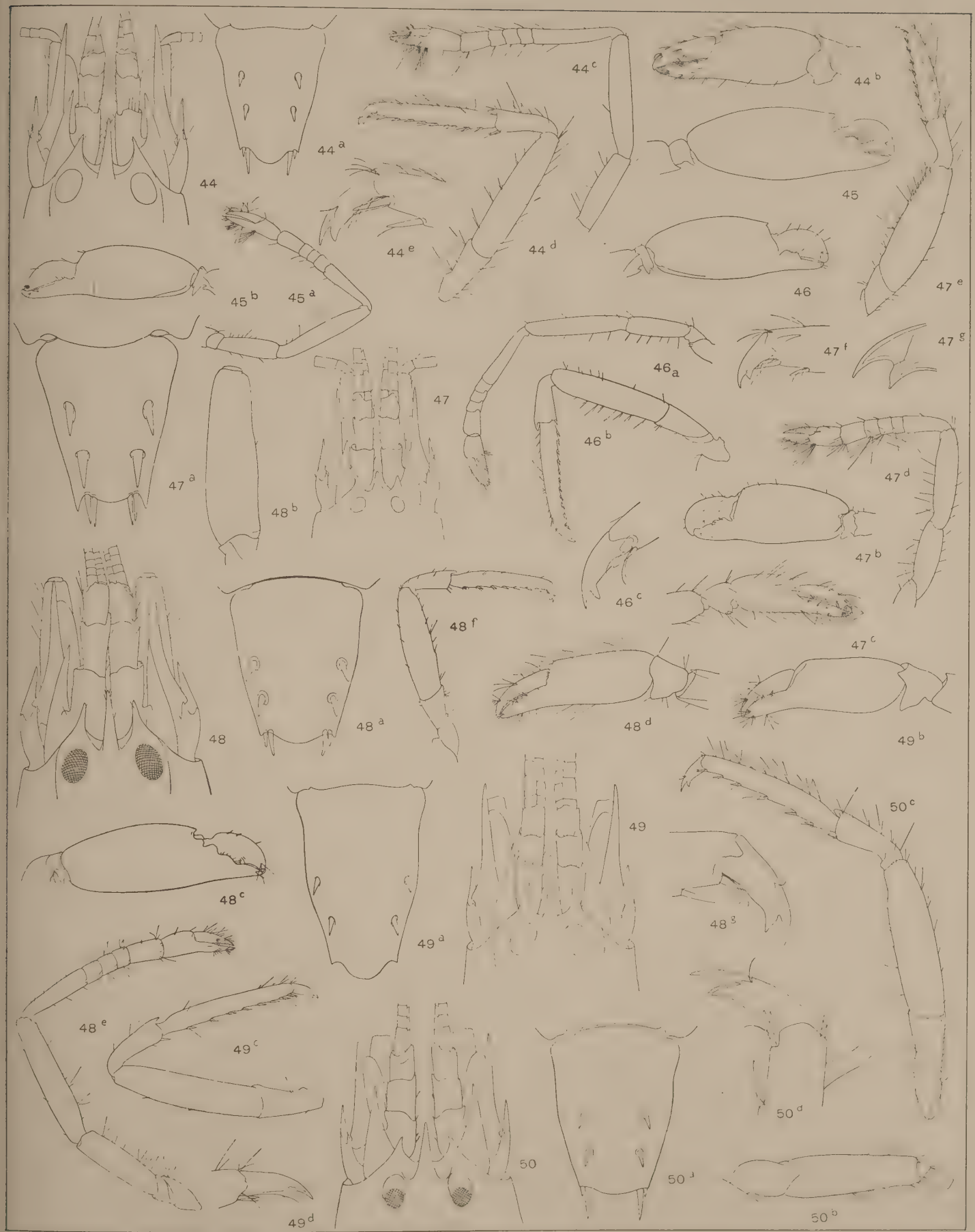

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PLATE XI.

Fig. 51. *Synalpheus biunguiculatus* (Stimps.) Cout., telson of the male from Stat. 282, × 15; 51*a* leg of the 3rd pair of this male, × 15; 51*b* dactylus of this leg, × 50; 51*c* leg of the 3rd pair of the female from the same Station, × 15; 51*d* dactylus of this leg, × 50.

Fig. 52. *Synalpheus amabilis* de Man. Type, frontal and antennal region, × 20; 52*a* telson, × 20; 52*b* and 52*c* large chela viewed from the inner respectively outer side, × 8; 52*d* and 52*e* small chela viewed from the inner respectively outer side, × 8; 52*f* leg of the 2nd pair, × 20; 52*g* leg of the 3rd pair, × 20; 52*h* dactylus of this leg, × 50.

Fig. 53. *Synalpheus bituberculatus* de Man, frontal and antennal region of the largest specimen from Stat 164, × 15; 53*a* frontal and antennal region of a specimen, long 12 mm. from Stat. 273, × 15; 53*b* frontal and antennal region of the specimen from Stat. 282, × 15; 53*c* telson of the specimen from Stat. 164, × 15; 53*d* telson of the specimen from Stat. 273, × 15; 53*e* large chela of the specimen from Stat. 273, viewed from the outer (lower) side, × 8; 53*f* the same chela viewed obliquely from behind, × 8; 53*g* carpus and chela of the small cheliped of the same specimen, viewed from the outer (lower) side, × 12; 53*h* leg of the 2nd pair, of the same specimen, × 15; 53*i* leg of the 3rd pair and 53*j* dactylus of this leg, of the same specimen, × 15 respectively, × 50.

Fig. 54. *Synalpheus bispinosus* de Man, frontal and antennal region, × 15; 54*a* telson, × 15; 54*b* large chela, outer (lower) side, × 8; 54*c* small cheliped, outer side, × 12; 54*d* leg of the 2nd pair, × 15; 54*e* leg of the 3rd pair, × 15; 54*f* dactylus of this leg, × 50. (All the figures are taken from the male from Stat. 33).

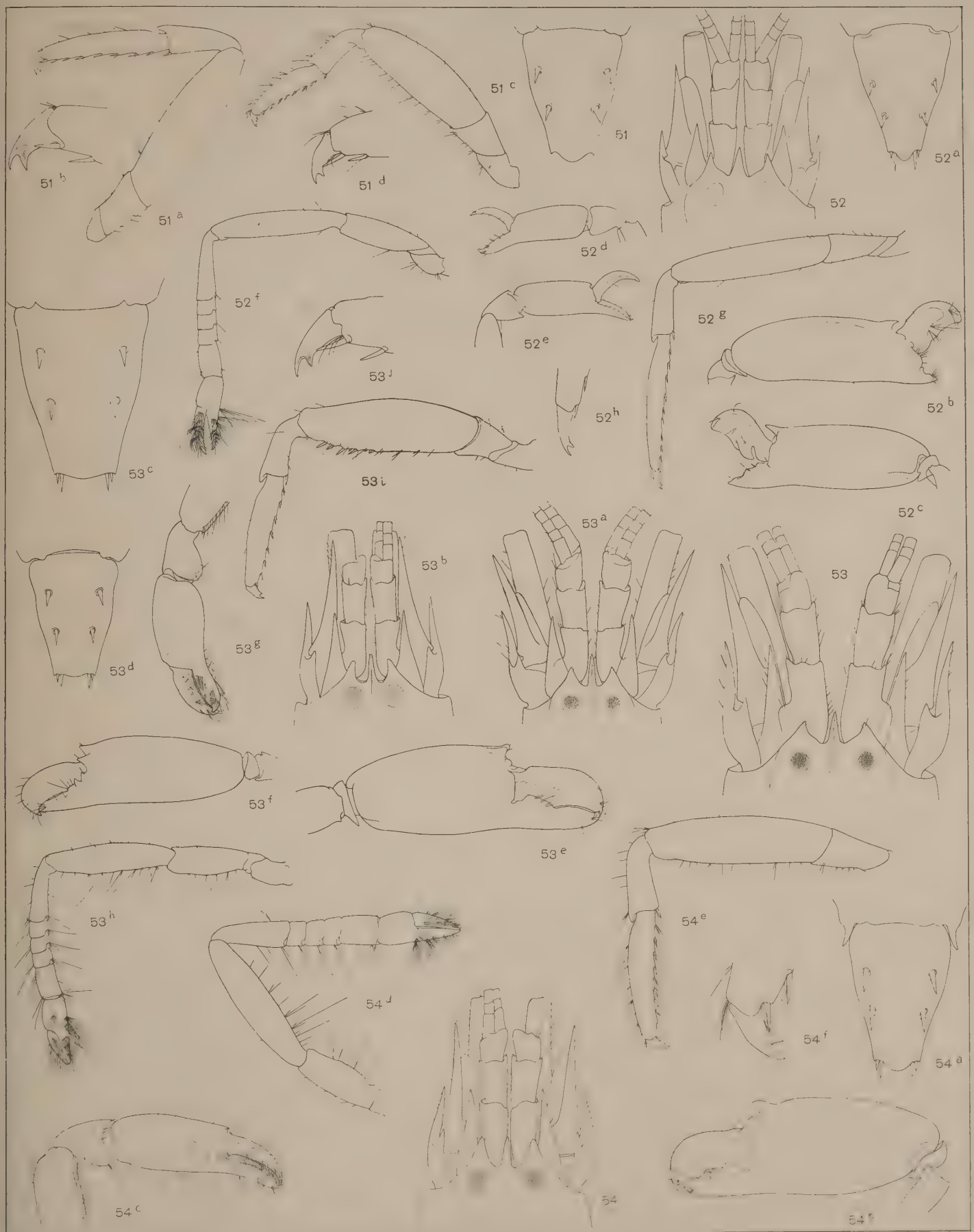

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PLATE XII.

Fig. 55. *Synalpheus triacanthus* de Man, frontal and antennal region, × 15; 55*a* telson, × 15; 55*b* large chela, inner side, × 6; 55*c* small cheliped, × 10; 55*d* leg of the 2nd pair, × 15; 55*e* leg of the 3rd pair, × 15; 55*f* dactylus of this leg, × 50.

Fig. 56. *Synalpheus quadridens* de Man, frontal and antennal region, × 25; 56*a* telson, × 25; 56*b* small cheliped, × 15; 56*c* leg of the 3rd pair, × 15; 56*d* dactylus of this leg, × 50.

Fig. 57. *Synalpheus quadrispinosus* de Man, frontal and antennal region, × 12; 57*a* telson, × 12; 57*b* large chela, outer side, × 6; 57*c* small cheliped, outer side, × 8; 57*d* leg of the 3rd pair, × 12; 57*e* dactylus of this leg, × 50; 57*f* dactylus of the 3rd leg of the adult specimen from Stat. 164, × 50; 57*g* dactylus of the 3rd leg of the young male from Stat. 315, × 50. (The figures 57—57*e* are taken from the adult female from Stat. 273).

Fig. 58. *Synalpheus trispinosus* de Man, frontal and antennal region of the adult specimen, × 12; 58*a* telson, × 12; 58*b* large chela, viewed from the lower outer side, × 6; 58*c* small cheliped, × 8; 58*d* leg of the 2nd pair, × 12; 58*e* leg of the 3rd pair, × 12; 58*f* dactylus of this leg, × 50.

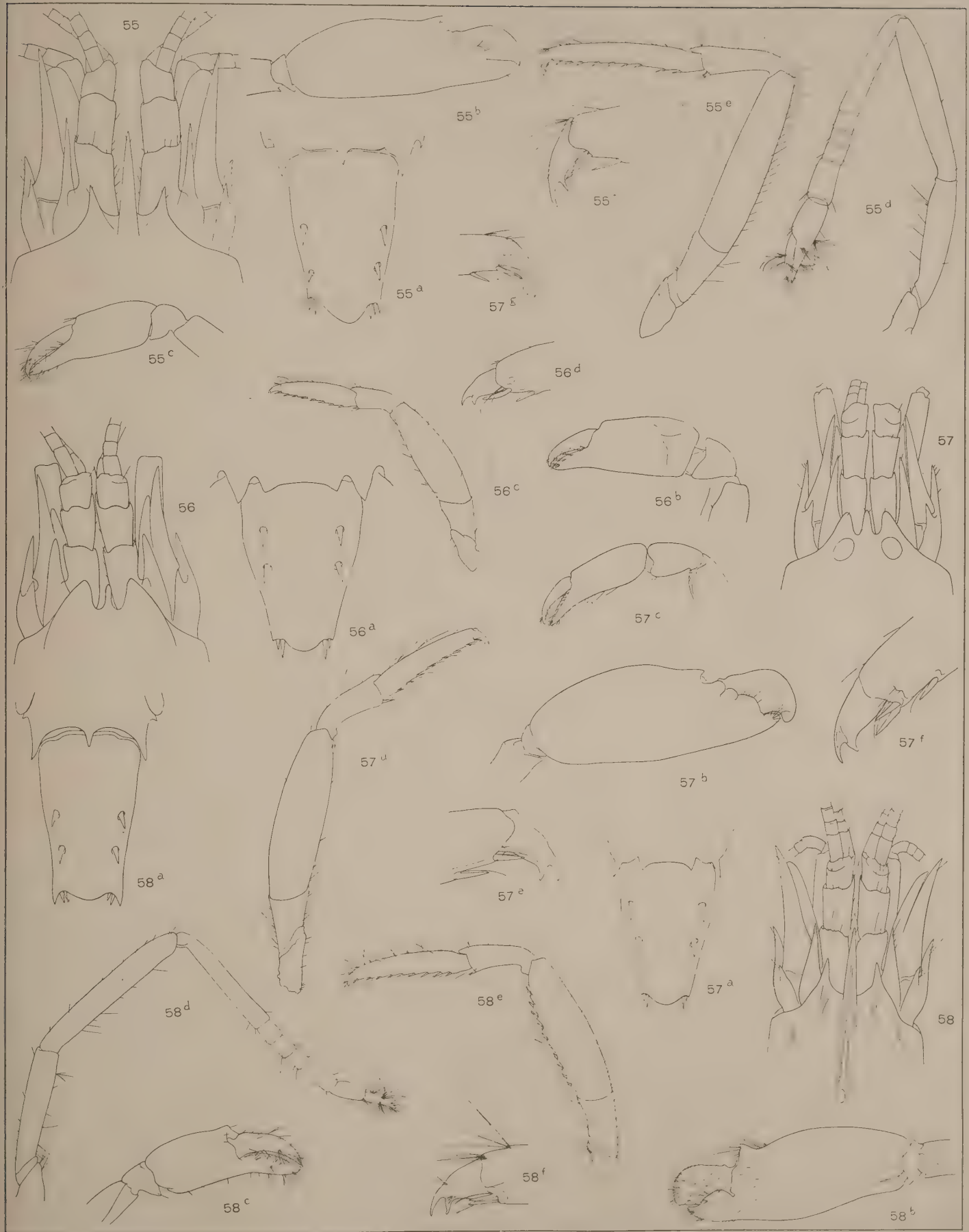

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PLATE XIII.

Fig. 59. *Synalpheus septemspinosus* de Man, frontal and antennal region, × 15; 59*a* telson, × 15; 59*b* large chela, × 8; 59*c* small cheliped, × 10; 59*d* leg of the 2nd pair, × 15; 59*e* leg of the 3rd pair, × 15; 59*f* dactylus of this leg, × 50.

Fig. 60. *Synalpheus neptunus* (Dana), telson of the male from Stat. 49, × 30; 60*a* leg of the 3rd pair of the specimen, long 10 mm., from Stat. 133, × 20; 60*b* dactylus of this leg, × 50.

Fig. 61. *Synalpheus Theano* de Man, frontal and antennal region, × 25; 61*a* telson, × 25; 61*b* large chela, × 8; 61*c* small cheliped, × 12; 61*d* leg of the 2nd pair, × 25; 61*e* leg of the 3rd pair, × 25; 61*f* dactylus of this leg, × 50; 61*g* extremity of this dactylus, × 160.

Fig. 62. *Synalpheus Antenor* de Man, telson of the egg-bearing female from Stat. 164, × 10; 62*a* small cheliped of this female, × 8; 62*b* extremities of the fingers of this chela, viewed from the inner side, × 25; 62*c* leg of the 2nd pair of a male, long 27 mm., from Amboina, described by me in 1888 under the name of *A. biunguiculatus*, × 8; 62*d* leg of the 3rd pair of the female from Stat. 164, × 8; 62*e* dactylus of this leg, × 50.

Fig. 63. *Synalpheus Pescadorensis* Cout., telson of the female from Stat. 96, × 30; 63*a* leg of the 2nd pair, × 20; 63*b* leg of the 3rd pair, × 20; 63*c* dactylus of this leg, × 50; 63*d* extremity of this dactylus, × 160.

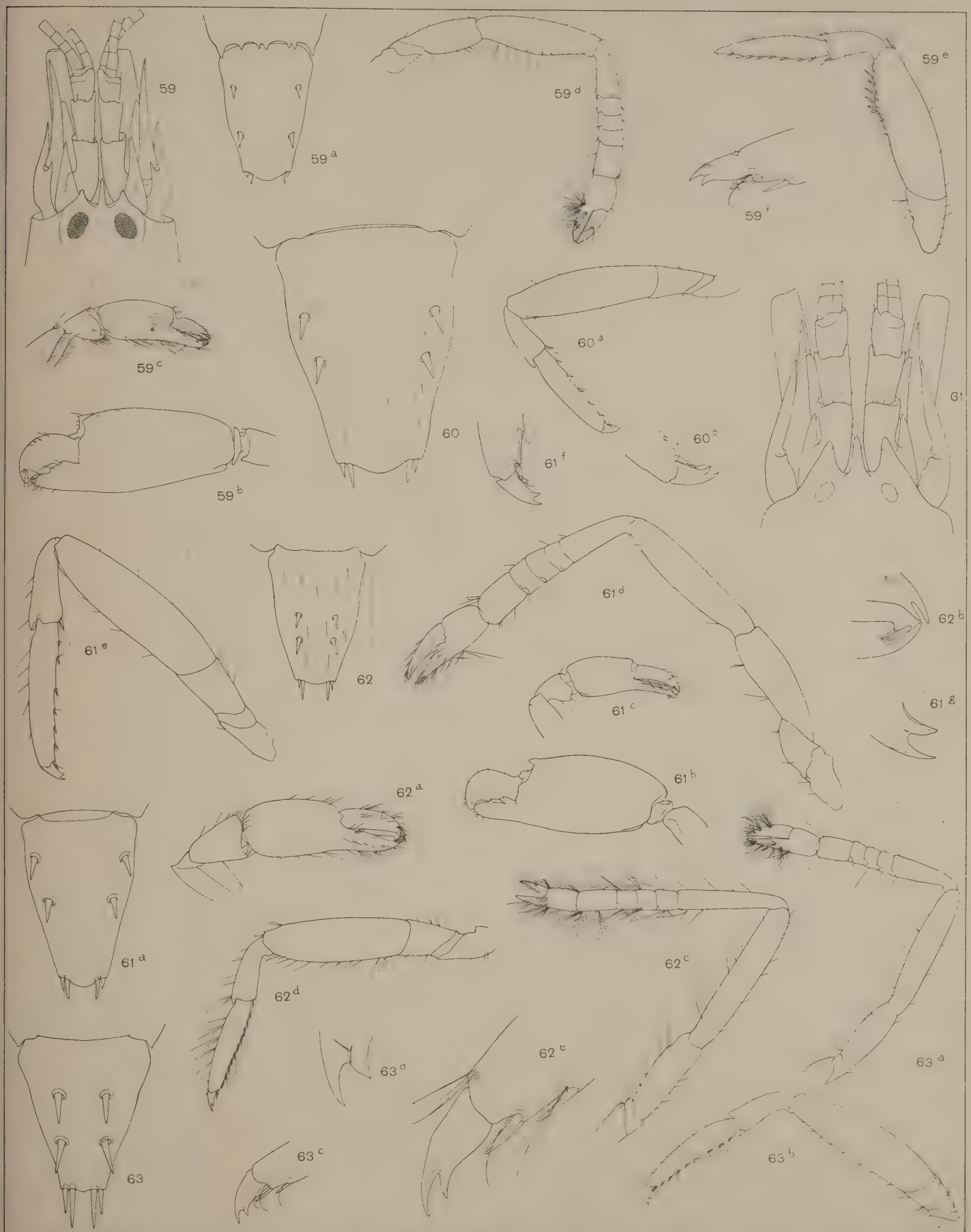

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PLATE XIV.

Fig. 64. *Alpheus Hailstonei* Cout., var. *assimulans* de Man, frontal and antennal region of the adult male from Stat. 260, × 10; 64*a* large chela of this specimen, outer side, × 10; 64*b* leg of the 3rd pair of the same, × 10; 64*c* dactylus of this leg, × 50.

Fig. 64*d*. *Alpheus Hailstonei* Cout., var. *laetabilis* de Man, dactylus of a male, long 15 mm., from Stat. 154, × 50; 64*e* dactylus of a female, long 16 mm., from Stat. 310, × 50.

Fig. 65. *Alpheus collumianus* Stimps., large chela of the adult male, long 16 mm., from Stat. 282, × 8; 65*a* the same chela, viewed from above, × 8; 65*b* small cheliped of the adult male from Stat. 66, × 8.

Fig. 66. *Alpheus gracilis* Heller, var. *luciparensis* de Man, frontal and antennal region of the specimen from Stat. 225, × 12; 66*a* telson of the same specimen, × 12.

Fig. 67. *Alpheus facetus* de Man, frontal and antennal region, × 10; 67*a* telson, × 10; 67*b* large cheliped, outer side, × 8; 67*c* upper border of the large chela, with the longitudinal groove, × 8; 67*d* small cheliped, viewed from the outer, lower side, × 8; 67*e* leg of the 3rd pair, × 8; 67*f* dactylus of this leg, × 50.

Fig. 68. *Alpheus microstylus* (Sp. Bate), var.?, left leg of the 2nd pair of the male from Stat. 40, × 10; 68*a* left leg of the 2nd pair of the young male of the typical *A. microstylus* (Sp. Bate) from Stat. 144, × 10.

Fig. 69. *Alpheus Lutini* Cout., frontal and antennal region of a specimen, long 13 mm., from Stat. 125, × 20; 69*a* scaphocerite, × 20.

Fig. 70. *Alpheus malleodigitus* (Sp. Bate), frontal and antennal region of a male, long 17 mm., from Stat. 213, × 10; 70*a* telson of an adult female from Stat. 213, × 12; 70*b* telson of an adult male from the same Station, × 12; 70*c* leg of the 2nd pair of this male, × 8; 70*d* leg of the 3rd pair of this male, × 8.

Fig. 70*e*. *Alpheus malleodigitus* (Sp. Bate), var. *gracilicarpus* de Man, leg of the 2nd pair of the ova-bearing female from Stat. 282, × 8; 70*f* leg of the 3rd pair of this female, × 8.

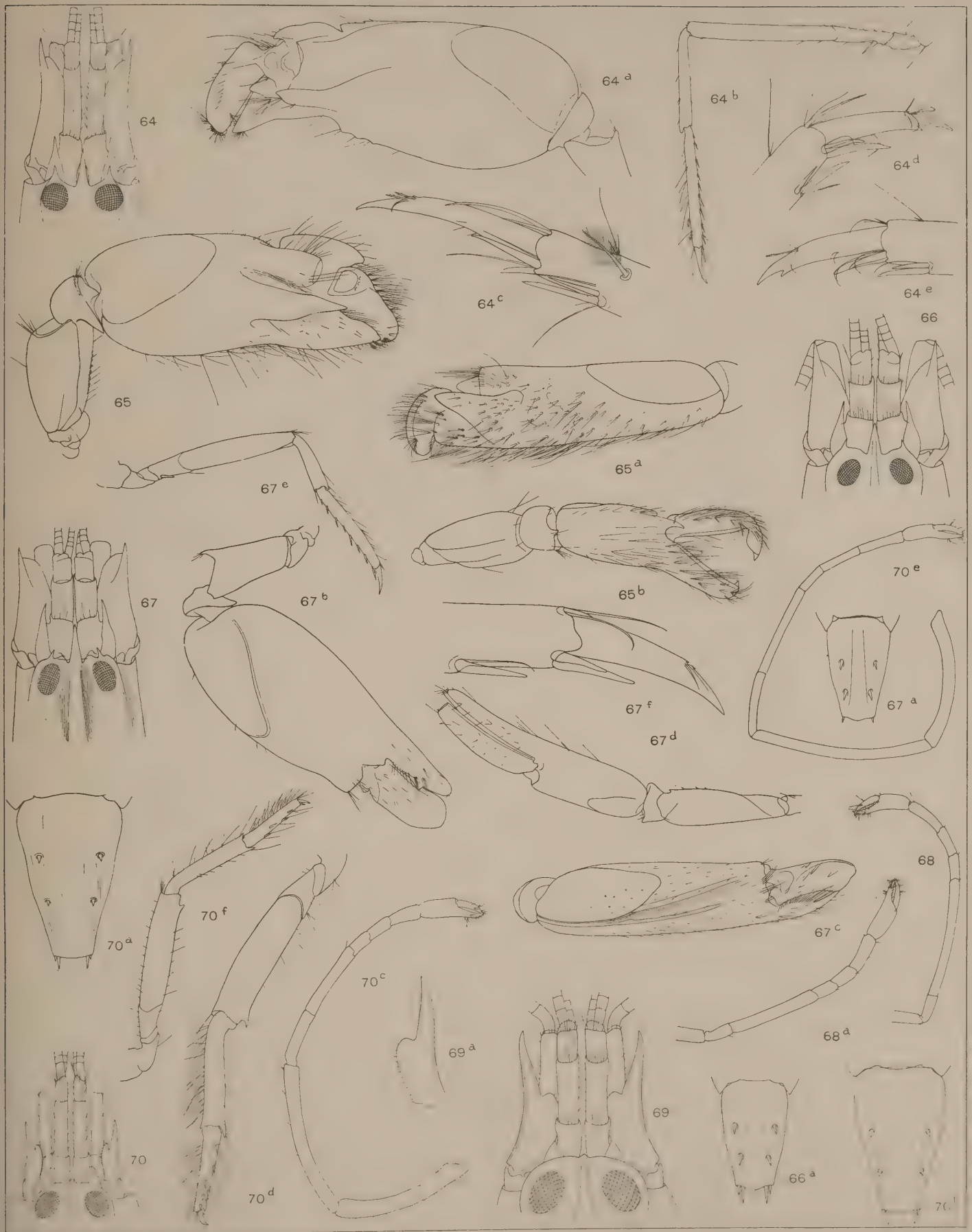

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PLATE XV.

Fig. 71. *Alpheus* sp., female from Stat. 66 with eggs, frontal and antennal region, × 20; 71*a* telson, × 20; 71*b* leg of the 3rd pair, × 10; 71*c* dactylus, × 50.

Fig. 72. *Alpheus Arethusa* de Man, frontal and antennal region of the male, × 20; 72*a* lateral view of the abdomen of the male, × 10; 72*b* the same of the female, × 10; 72*c* telson of the male, × 20; 72*d* large cheliped of the male, outer side, × 10; 72*e* large chela of the male, lower side, × 10; 72*f* large cheliped of the female, outer side, × 10; 72*g* large chela of the female, lower side, × 10; 72*h* small cheliped of the male, outer side, × 12; 72*i* small chela of the male, lower side, × 12; 72*j* small cheliped of the female, outer side, × 12; 72*k* small chela of the female, lower side, × 12; 72*l* leg of the 2nd pair of the male, × 20; 72*m* leg of the 3rd pair of the male, × 20; 72*n* dactylus of this leg, × 50.

Fig. 73. *Alpheus paralcyone* Cout., large chela of the largest specimen from Stat. 49a, viewed from the outer side, viz. the upper border, × 8; 73*a* the same, viewed from the inner side, viz. the inner border, × 8; 73*b* leg of the 3rd pair, × 12; 73*c* leg of the 4th pair, × 12.

Fig. 74. *Alpheus parvus* de Man, frontal and antennal region, × 25; 74*a* telson, × 25; 74*b* small cheliped, × 20, the chela is looked at somewhat obliquely from the inner side, so that the basal part of the dactylus is invisible, immobile finger broken off in the middle; 74*c* merus, carpus and chela of the 2nd leg, × 25; 74*d* leg of the 3rd pair, × 25.

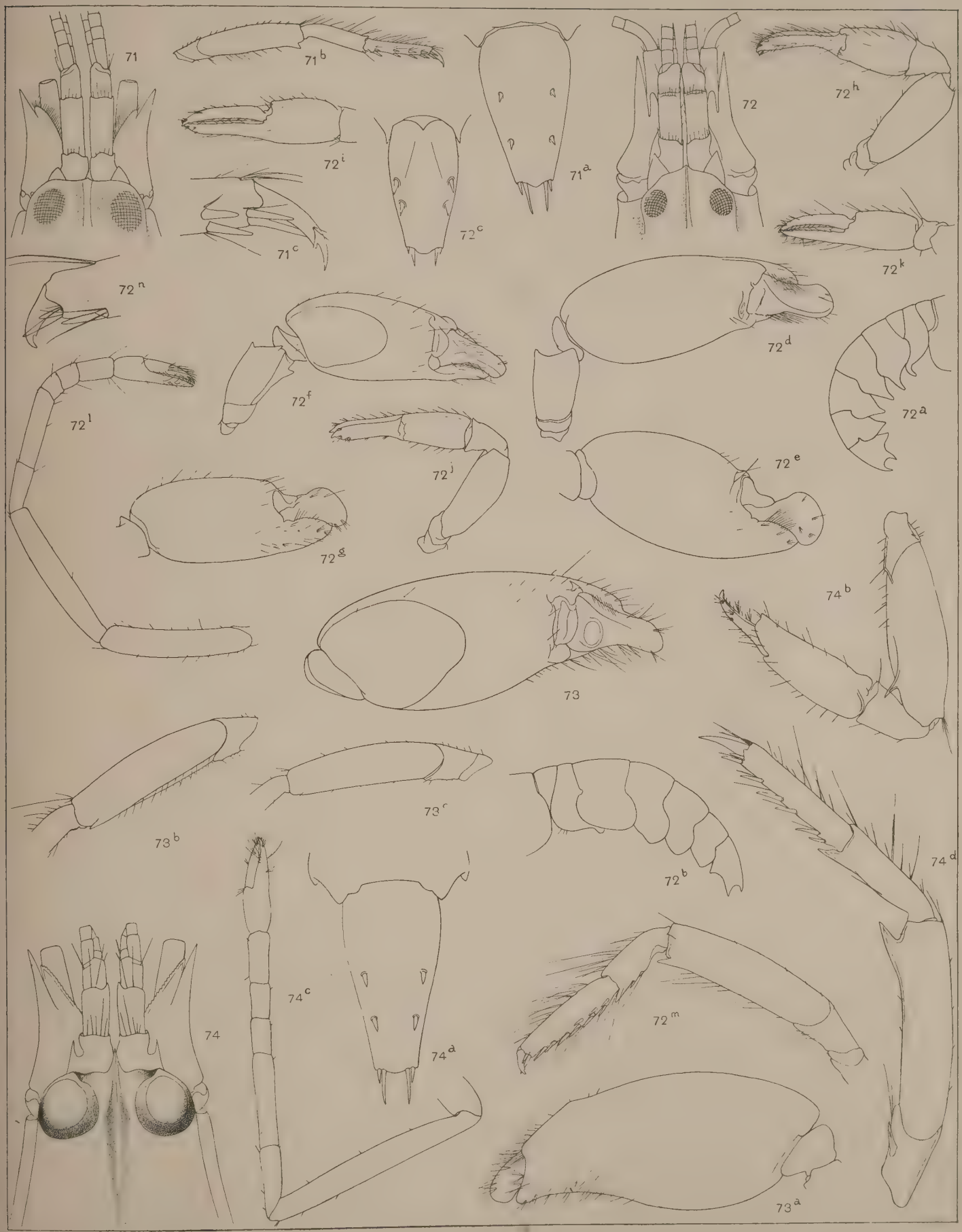

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PLATE XVI.

Fig. 75. *Alpheus consobrinus* de Man. All the figures are taken from the adult male from Stat. 78, except the figures 75*d*, 75*g* and 75*h* that are taken from the adult female from Stat. 315. — Fig. 75, frontal and antennal region, × 15; 75*a* telson, × 15; 75*b* large cheliped of the male, outer side, × 8; 75*c* large chela of the male, lower side, × 8; 75*d* large cheliped of the female, outer side, × 8; 75*e* small cheliped of the male, outer side, × 12; 75*f* small chela of the male, lower side, × 12; 75*g* small cheliped of the female, outer side, × 12; 75*h* small chela of the female, lower side, × 12; 75*i* right leg of the 2nd pair of the male, × 8; 75*j* leg of the 3rd pair of the male, × 8; 75*k* dactylus of this leg, × 50; 75*l* leg of the 4th pair of the male, × 8.

Fig. 76. *Alpheus Eulimene* de Man, frontal and antennal region, × 20; 76*a* telson, × 20; 76*b* large cheliped viewed from the outer side, × 8; 76*c* large chela, lower side, × 8; 76*d* small cheliped, outer side, × 16; 76*e* small chela, lower side, × 16; 76*f* leg of the 2nd pair, × 20; 76*g* leg of the 3rd pair, × 20; 76*h* dactylus of this leg, × 50; 76*i* leg of the 4th pair, × 20.

Fig. 77. *Alpheus pachychirus* Stimps., telson and right half of the caudal fan of the male from Stat. 315, × 15; 77*a* small cheliped of this male, outer side, × 10; 77*b* terminal joint of one of the outer foot-jaws of the female from Stat. 133, × 35: this joint is also 1,06 mm. long like in the male (text, p. 366), but only 0,364 mm. broad and appears therefore 2,9-times as long as broad.

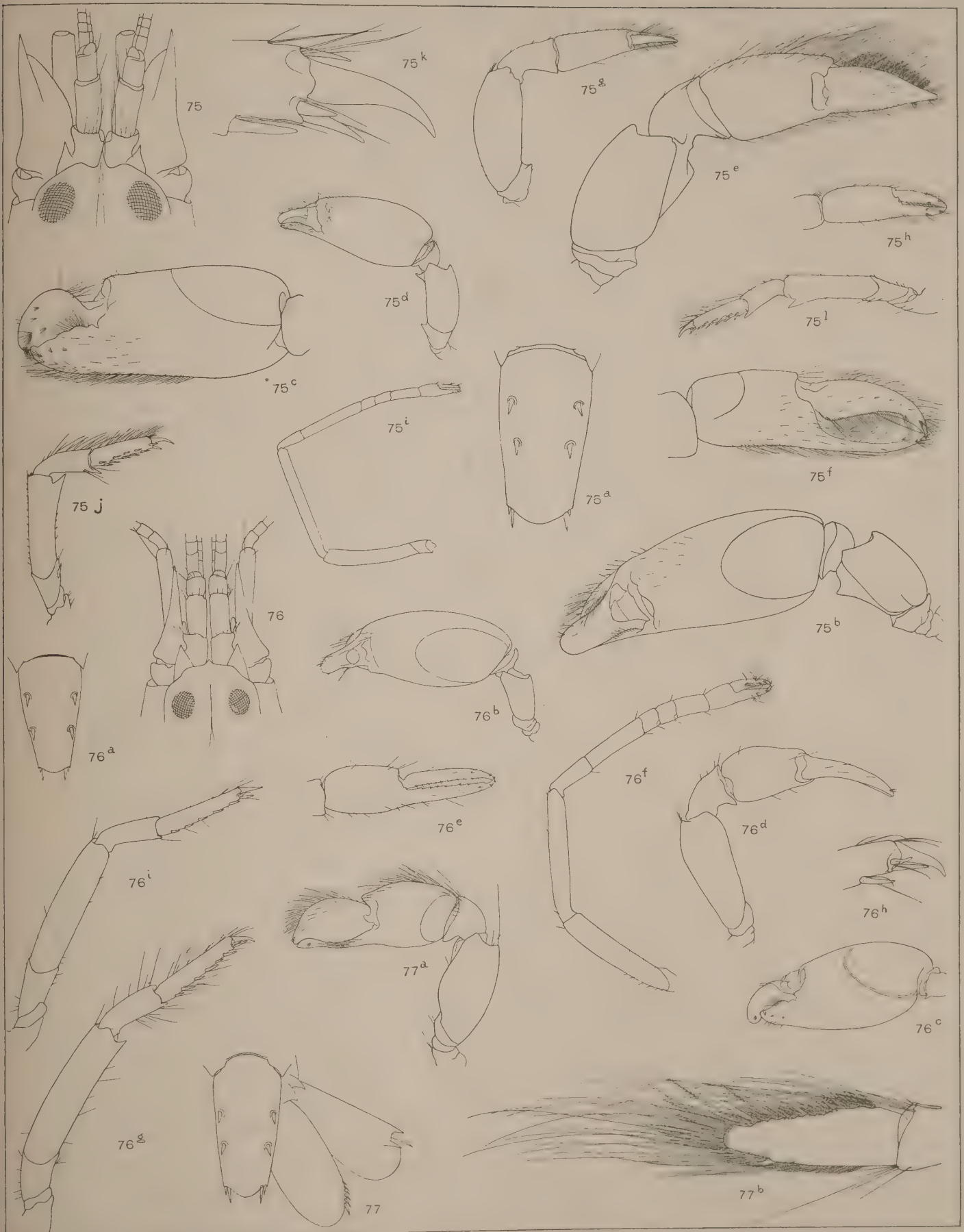

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PLATE XVII.

Fig. 78. *Alpheus Stanleyi* Cout. var. *dearmatus* de Man, frontal and antennal region of the largest specimen from Stat. 152, × 20; 78*a* telson of this specimen, × 20; 78*b* large cheliped of the male from Stat. 240, outer side, × 8; 78*c* large chela of this male, lower side, × 8; 78*d* small cheliped of this male, outer side, × 12; 78*e* small chela of this male, lower side, × 12; 78*f* leg of the 2nd pair of this male, × 15; 78*g* leg of the 3rd pair of the largest specimen from Stat. 152, × 15; 78*h* leg of the 4th pair of this specimen, × 15.

Fig. 79. *Alpheus frontalis* H. M.-Edw., frontal and antennal region of the adult male from Haingsisi, × 5; 79*a* the same of an egg-bearing female from Stat. 213, × 5; 79*b* the same of the egg-bearing female from Stat. 261, × 5.

Fig. 80. *Alpheus bidens* (Oliv.), frontal and antennal region of the male from Stat. 133, × 10; 80*a* small cheliped of this male, outer side, × 8; 80*b* small chela of this male, lower side, × 8; 80*c* left leg of the 3rd pair, × 8.

Fig. 81. *Alpheus praedator* de Man, frontal and antennal region, × 15; 81*a* telson, × 20; 81*b* external maxilliped, × 12; 81*c* large cheliped, outer side, × 10; 81*d* large chela, lower side, × 10; 81*e* small cheliped, outer side, × 12; 81*f* small chela, lower side, × 12; 81*g* leg of the 2nd pair, × 12; 81*h* leg of the 3rd pair, × 12; 81*i* leg of the 4th pair, × 12.

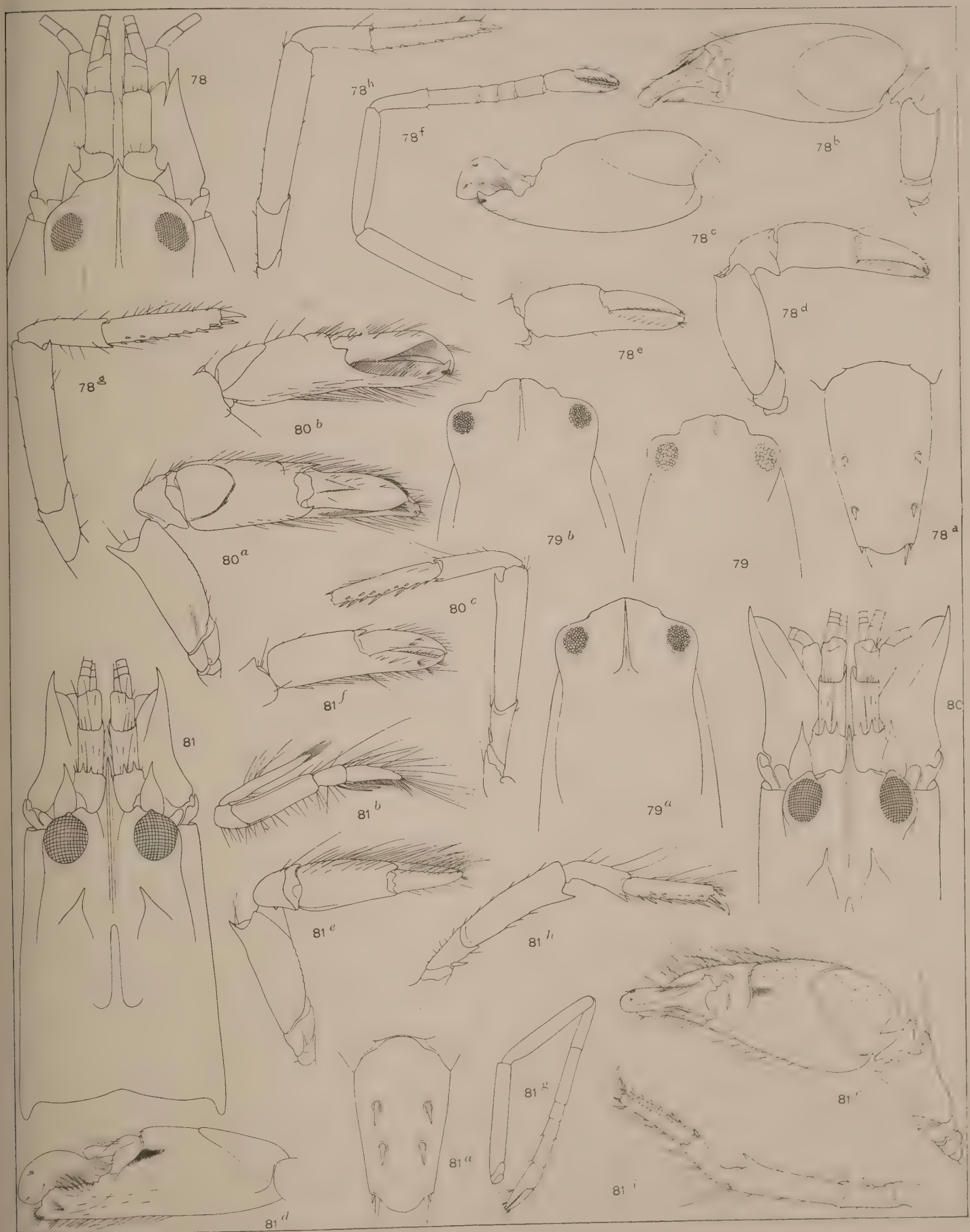

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PLATE XVIII.

Fig. 82. *Alpheus bicostatus* de Man. All the figures are taken from the adult male from Stat. 205, except 82*g* and 82*h* that are taken from the female from the same Station. Fig. 82 frontal and antennal region, × 10; 82*a* lateral view of the anterior part of the carapace, × 10; 82*b* telson [1]), × 10; 82*c* large cheliped, outer side, × 10; 82*d* large chela, lower side, × 10; 82*e* small cheliped, outer side, × 10; 82*f* small chela, lower side, × 10; 82*g* small cheliped of the ova-bearing female, outer side, × 10; 82*h* small chela of this female, × 10; 82*i* right leg of the 2nd pair, × 10; 82*j* leg of the 3rd pair, × 10; 82*k* leg of the 4th pair, × 10.

Fig. 83. *Alpheus Philoctetes* de Man, frontal and antennal region, × 25; 83*a* telson, × 25; 83*b* small cheliped, inner side, × 15; 83*c* small chela, outer side, × 15; 83*d* leg of the 2nd pair, × 25; 83*e* leg of the 3rd pair, × 25.

Fig. 84. *Alpheus tenuicarpus* de Man. The figures 84—84*e* are taken from the male from Stat. 144, the figures 84*f* and 84*g* from another specimen, probably also a male from the same Station. — Fig. 84, frontal and antennal region, × 20; 84*a* telson, × 20; 84*b* large cheliped, looked at obliquely from the lower side, × 10; 84*c* small cheliped looked at in the same manner, × 10; 84*d* small chela, upper side, × 10.

1) The telson, which has not been described in the text, is 2,8-times as long and 1,425-times as wide anteriorly as the posterior margin is broad. The spinules of the upper surface are rather large, situated nearly as far from the median line as from the lateral margins; the anterior pair are situated somewhat before the middle, while the posterior pair are somewhat farther distant from the posterior margin as from the anterior pair.

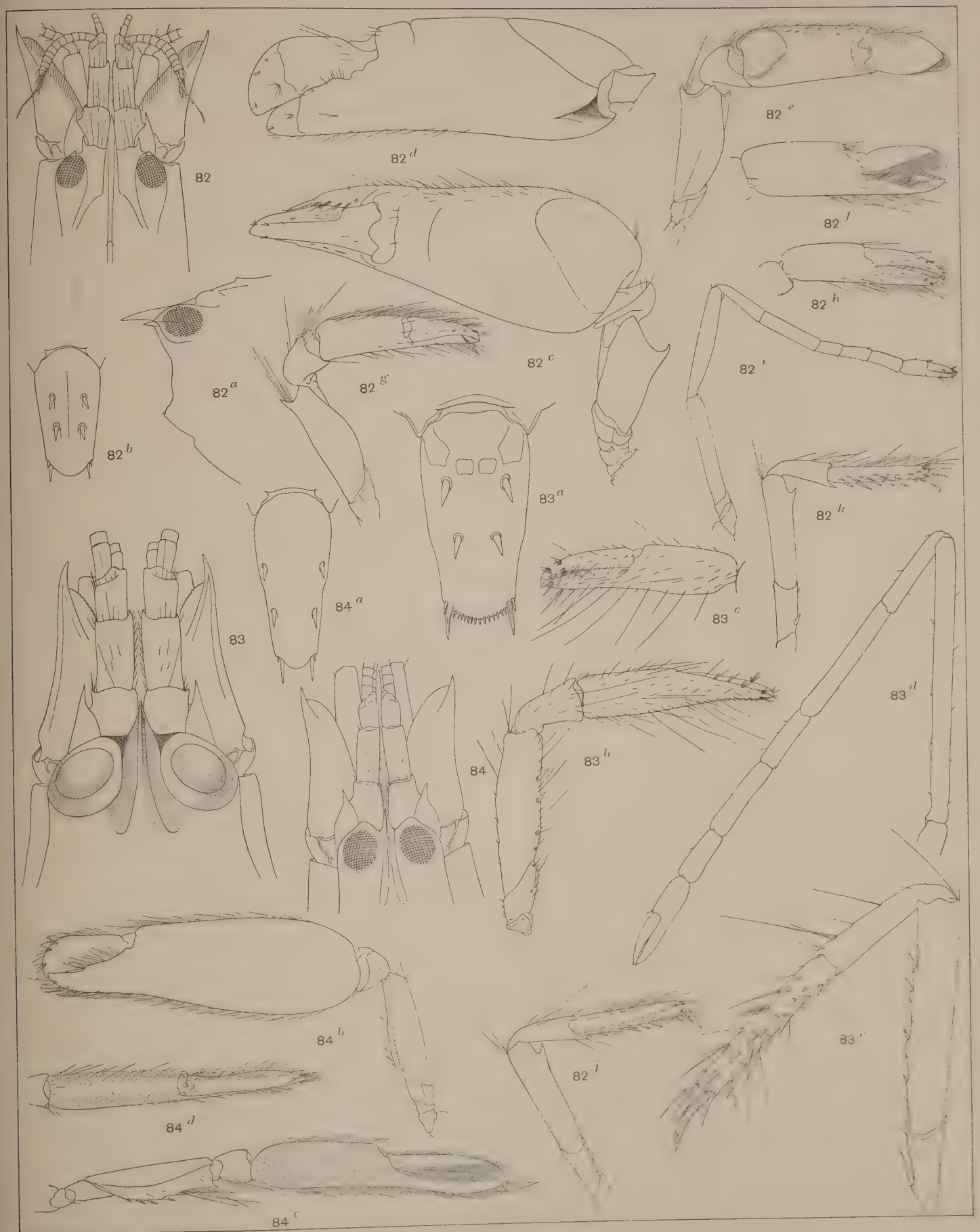

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PLATE XIX.

Fig. 84*e*. *Alpheus tenuicarpus* de Man, leg of the 2nd pair, × 16; 84*f* leg of the 3rd pair, × 16; 84*g* dactylus of this leg, × 50.

Fig. 85. *Alpheus* sp., frontal and antennal region of the specimen from Stat. 51, × 20; 85*a* large cheliped, outer side, × 10; 85*b* leg of the 2nd pair, × 16.

Fig. 86. *Alpheus tenuipes* de Man, frontal and antennal region of the larger specimen from Stat. 204, × 30; 86*a* telson of this specimen, × 30; 86*b* large, 86*c* small cheliped of the female, long 11,5 mm., outer side, × 20; 86*d* ischium, merus and carpus of the right 3rd leg of the female, outer side, × 25; 86*e* propodus and dactylus of this leg, × 25; 86*f* ischium, merus and carpus of the 5th leg of the female, × 25; 86*g* propodus and dactylus of this leg, × 25.

Fig. 87. *Alpheus brevirostris* (Oliv.) *angustodigitus* de Man, telson of the male from Balikpapan, × 8; 87*a* telson of the female from the same locality, × 8; 87*b* small cheliped of the male, outer side, though a little obliquely, × 4; 87*c* dactylus of this chela, looked at from above, × 4; 87*d* leg of the 2nd pair of the male, × 4.

Fig. 88. *Alpheus barbatus* Cout., frontal and antennal region of the probably male specimen of medium size from Stat. 311, × 15; 88*a* scaphocerite, × 25; 88*b* leg of the 2nd pair, × 15; 88*c* leg of the 3rd pair, × 15.

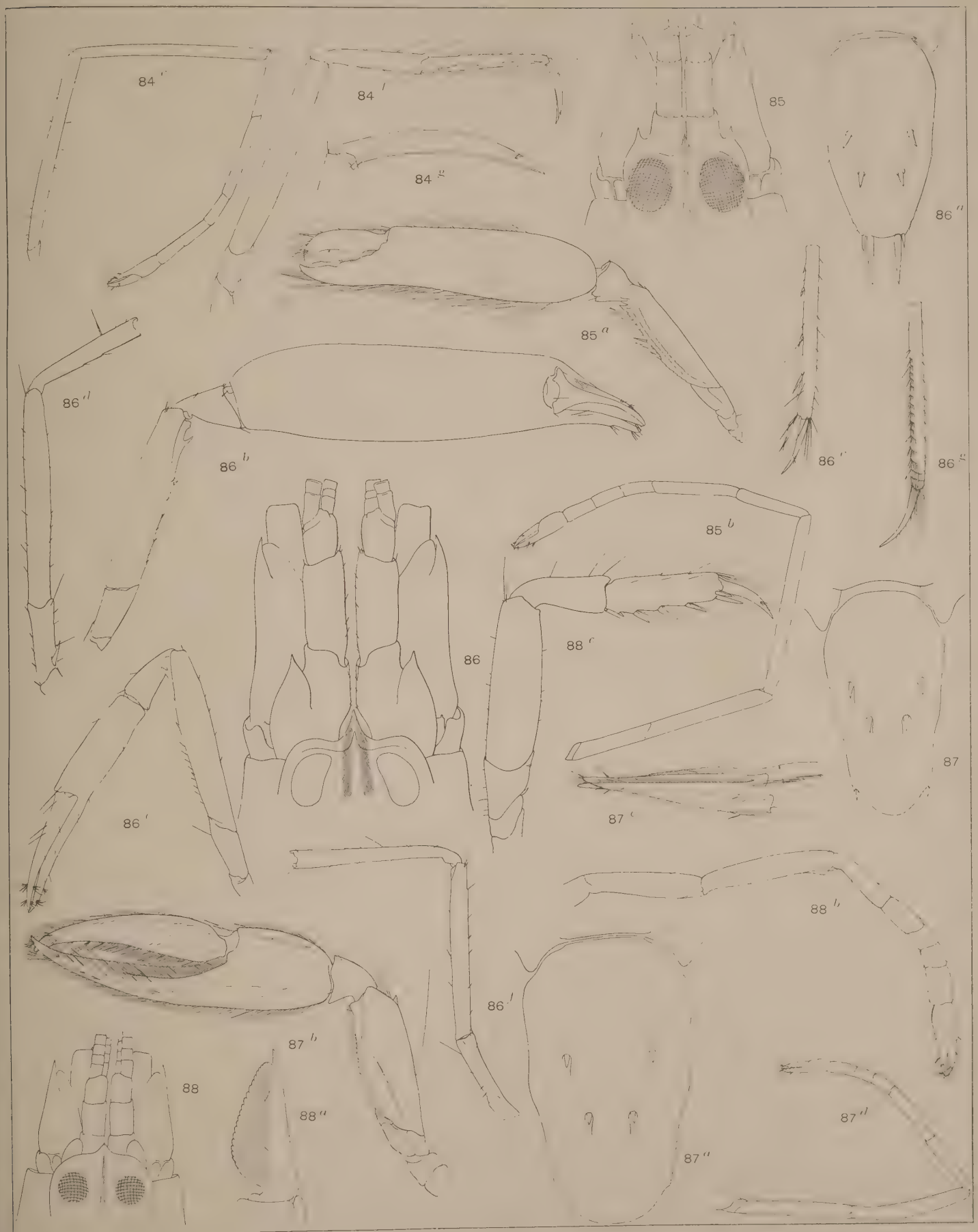

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PLATE XX.

Fig. 89. *Alpheus pubescens* de Man. All the figures are taken from the adult male from Stat. 273, except the figures 89*f* and 89*g*. — Fig. 89, frontal and antennal region, × 10; 89*a* telson, × 10; 89*b* large cheliped, outer side, × 8; 89*c* large chela, viewed at from above, × 8; 89*d* small cheliped, outer side, × 8; 89*e* small chela looked at from above, × 8; 89*f* large cheliped of the adult female from Stat. 162; outer side, × 8; 89*g* small cheliped of the egg-bearing female from Stat. 71, × 8; 89*h* leg of the 2nd pair, × 8; 89*i* leg of the 3rd pair, × 8.

Fig. 90. *Alpheus savuensis* de Man, frontal and antennal region of the male from Stat. 58, × 10; 90*a* large cheliped, outer side, × 8; 90*b* small cheliped, outer side, looked at somewhat obliquely, × 8; 90*c* small chela, viewed from above, × 8; 90*d* leg of the 2nd pair, × 8; 90*e* leg of the 3rd pair, × 8.

Fig. 91. *Alpheus rapacida* de Man, frontal and antennal region, × 10; 91*a* telson, × 10; 91*b* large cheliped, outer side, × 8; 91*c* small cheliped, outer side, × 8; 91*d* the two last joints of the right external maxilliped, × 8; 91*e* leg of the 2nd pair, × 8; 91*f* leg of the 3rd pair, × 8. (All the figures are taken from the probably male specimen from Stat. 279).

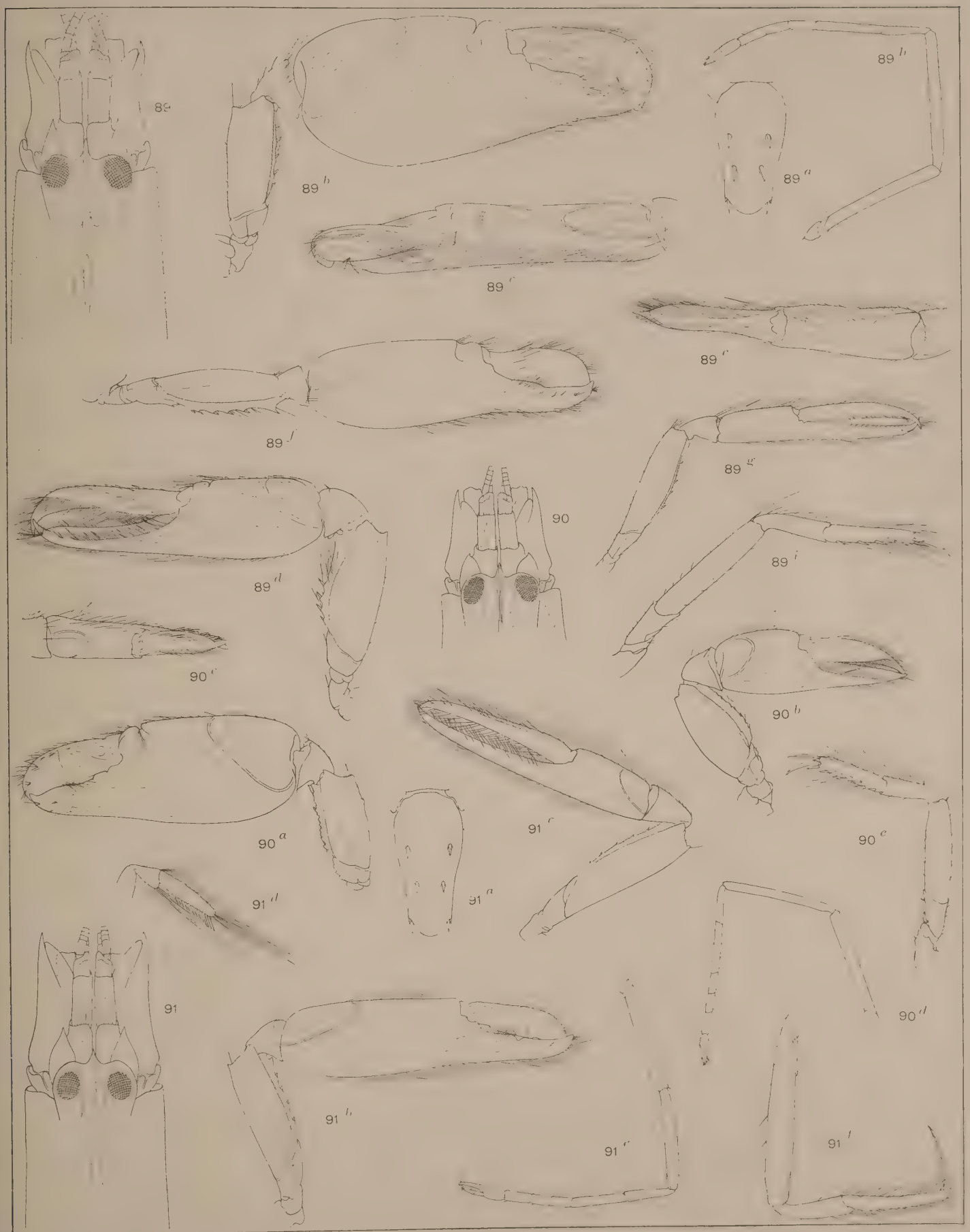

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PLATE XXI.

Fig. 92. *Alpheus lepidus* de Man, carapace and antennal region of the male from Stat. 114, showing how far runs the rostral carina, × 10; 92*a* frontal and antennal region of this specimen, × 20; 92*b* the two last joints of the right outer footjaw of this specimen, × 20; 92*c* large cheliped of the female, long 13,5 mm., from the same Station, outer side, × 15; 92*d* leg of the 2nd pair of the male from Stat. 114, × 10; 92*e* leg of the 3rd pair of this male, × 10; 92*f* dactylus of this leg, upper side, though looked at somewhat obliquely, *a* the dorsal ridge, × 50.

Fig. 93. *Alpheus Sibogae* de Man, frontal and antennal region of the egg-bearing female from Stat. 51, × 15; 93*a* lateral view of the anterior part of the carapace, × 15; 93*b* right external maxilliped of the male from the same Station, × 15; 93*c* large cheliped of this male, outer side, × 10; 93*d* small cheliped of this male, outer side, × 10; 93*e* small chela of this male, looked at from above, × 10; 93*f* small cheliped of the female, outer side, × 10; 93*g* small chela of the female, looked at from above, × 10; 93*h* leg of the 2nd pair of the male, × 15; 93*i* leg of the 3rd pair of the male, × 15; 93*j* right scaphocerite of the female, × 20.

Fig. 94. *Alpheus acutocarinatus* de Man, carapace and antennal region of the adult, probably male specimen from Stat. 19, × 8; 94*a* telson of this specimen, × 10; 94*b* large cheliped of the same specimen, outer side, × 6; 94*c* small cheliped of the male from Stat. 2, × 6; 94*d* small chela of this male, looked at from above, × 6; 94*e* small cheliped of the ova-bearing female from Stat. 19, outer side, × 6; 94*f* small chela of this female, looked at from above, × 6.

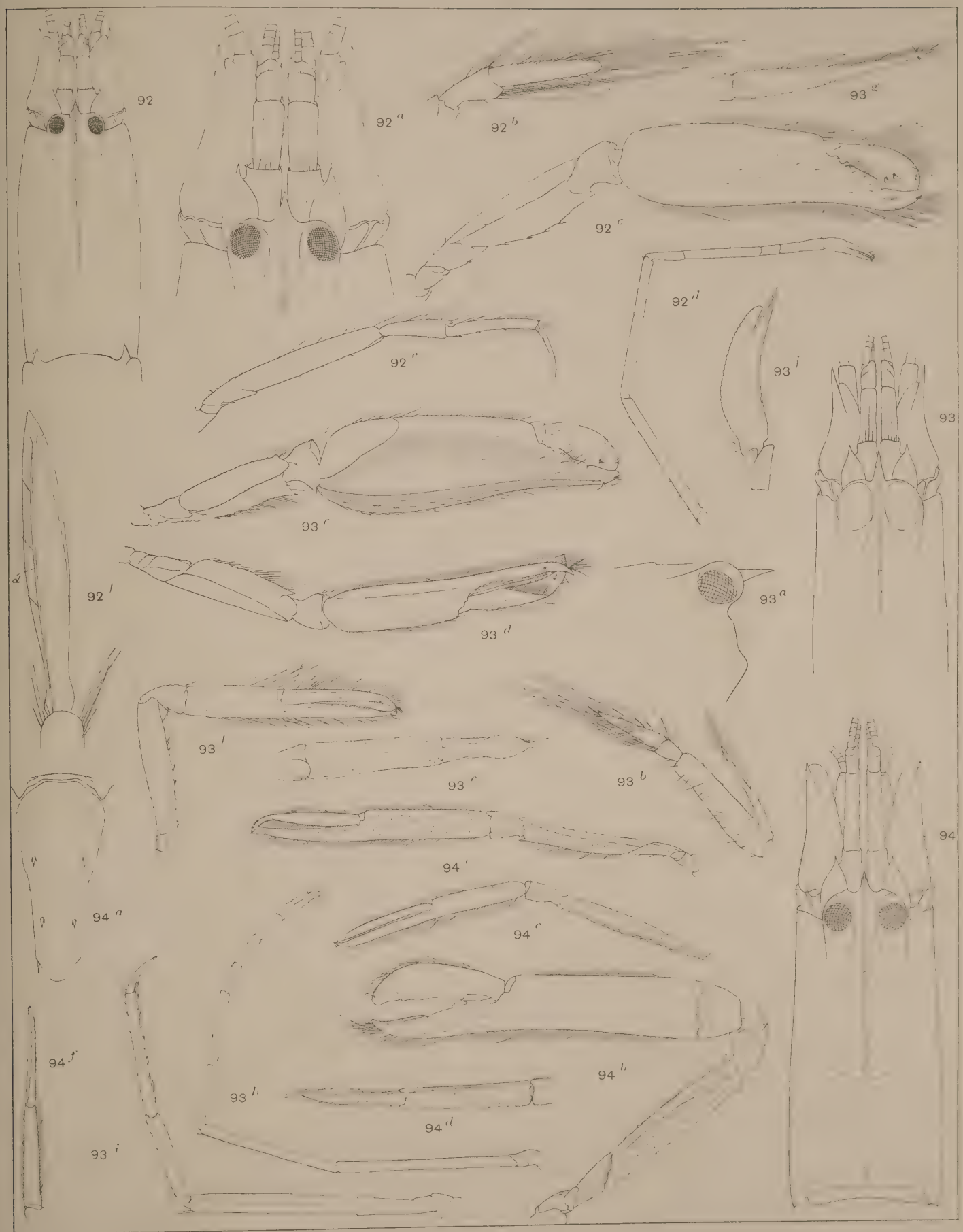

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PLATE XXII.

Fig. 94*g*. *Alpheus acutocarinatus* de Man, leg of the 2nd pair of the male from Stat. 19, × 6; 94*h* leg of the 3rd pair of this male, × 6; 94*i* lateral view of the dactylus of this leg, × 10; 94*j* the same dactylus looked at somewhat obliquely from above, × 10.

Fig. 95. *Alpheus bis-incisus* de Haan, frontal and antennal region of the ova-bearing female from the North coast of Sumatra, × 8.

Fig. 95*a*. *Alpheus bis-incisus* de Haan, var. *variabilis* de Man, frontal and antennal region of an adult male, long 25 mm., from Stat. 71, × 8; 95*b* large chela, 95*c* small chela of this male, outer side, × 8; 95*d* large chela, 95*e* small chela of an adult female, long 23 mm., from the same Station, outer side, × 8.

Fig. 96. *Alpheus proseuchirus* de Man, frontal and antennal region of the adult female from Stat. 114, × 10; 96*a* right scaphocerite of this female, × 10; 96*b* external maxilliped of this female, × 10; 96*c* large cheliped, outer side, of the young specimen, long 14,5 mm., from Stat. 114, × 10; 96*d* small cheliped of the adult female from Stat. 116, × 10; 96*e* leg of the 2nd pair of this female, × 10; 96*f* leg of the 3rd pair of this female, × 10; 96*g* dactylus of this leg, viewed from above, × 25.

Fig. 97. *Alpheus Coutierei* de Man, carapace and antennal region of the egg-bearing female from Stat. 282, × 10; 97*a* frontal and antennal region of this female, × 20; 97*b* abdomen of the male from Stat. 96, × 10; 97*c* telson of the female from Stat. 282, × 20.

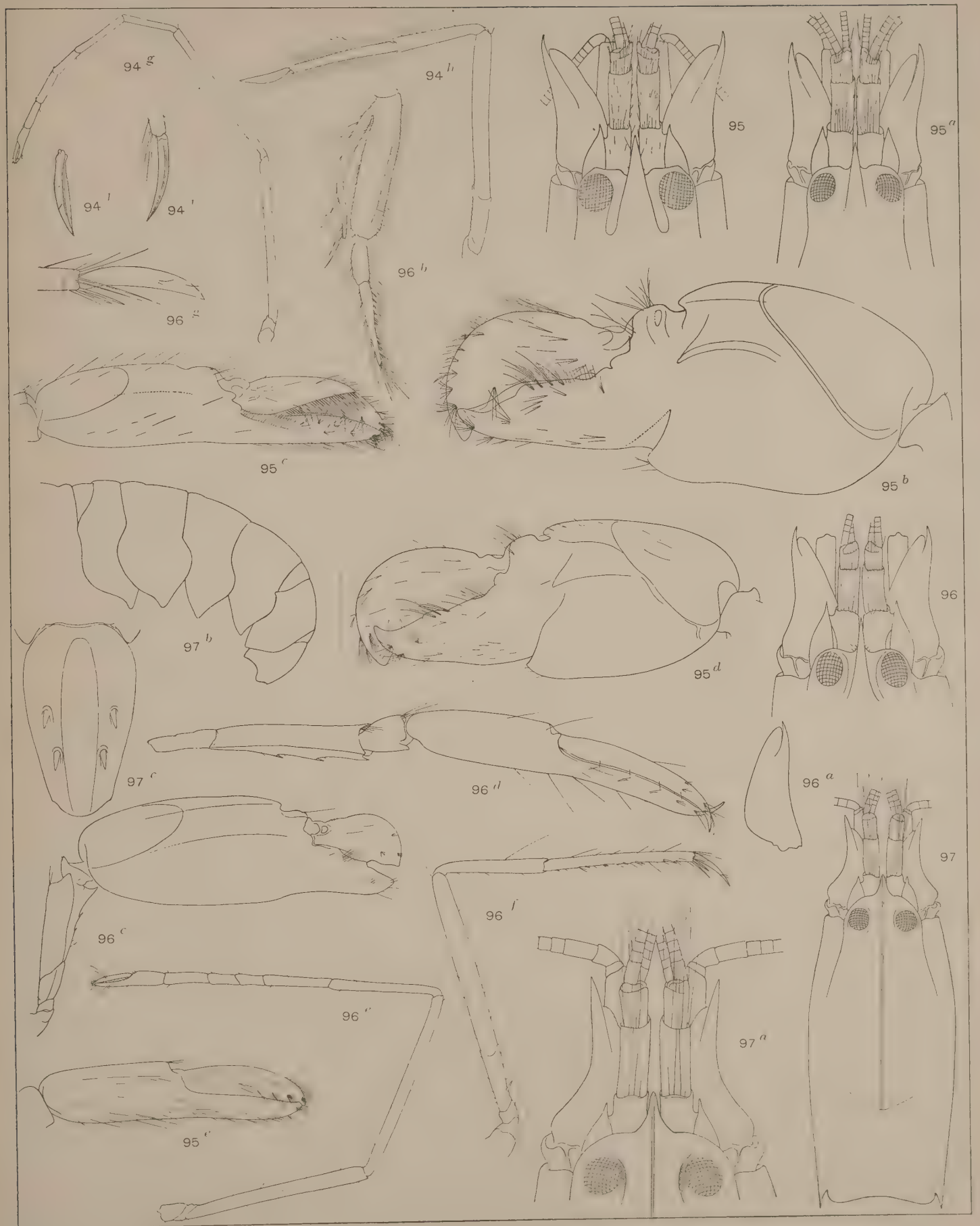

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PLATE XXIII.

Fig. 97*d*. *Alpheus Coutierei* de Man, large cheliped of this female, outer side, × 10; 97*e* small cheliped of this female, outer side, × 10; 97*f* leg of the 2nd pair of this female, × 10; 97*g* leg of the 3rd pair of this female, × 10.

Fig. 98. *Alpheus leviusculus* Dana, frontal and antennal region of the ova-bearing female from Stat. 250, × 15; 98*a* and 98*b* large cheliped of this female viewed from the outer respectively the inner side, × 10.

Fig. 99. *Alpheus microrhynchus* de Man, frontal part of the carapace, × 4; 99*a* telson, × 4.

Fig. 100. *Alpheus Audouini* Cout., frontal and antennal region of a female, long 28 mm., from Stat. 181, × 8; 100*a* large chela of this female, × 6; 100*b* the same viewed from above, × 6.

Fig. 101. *Alpheus pareuchirus* Cout., large chela of the adult male from Stat. 99, outer side, × 10; 101*a* the same, inner side, × 10; 101*b* small chela of this male, outer side, × 10; 101*c* the same viewed from the upper side, × 10.

Fig. 102. *Alpheus pareuchirus* Cout. var. *Leucothea* de Man, large chela, outer side, of an adult male, long 17 mm., from Stat. 49a, × 10; 102*a* the same chela, inner side, × 10; 102*b* small chela of this male, outer side, × 10; 102*c* this chela looked at from above, × 10; 102*d* leg of the 2nd pair of this male, × 10; 102*e* leg of the 3rd pair of this male, × 10; 102*f* small chela, outer side, of the female, long 18,5 mm., from Stat. 96, × 9.

Fig. 103. *Alpheus leptochiroides* de Man, frontal and antennal region of the male from Stat. 260, × 25; 103*a* large chela, outer side, × 15; 103*b* small chela, viewed from the upper side, × 15.

Fig. 104. *Alpheus Polyxo* de Man, frontal and antennal region, × 10; 104*a* telson, × 10; 104*b* small cheliped, outer side, × 8; 104*c* small chela, upper side, × 8; 104*d* leg of the 2nd pair, × $7^1/_2$; 104*e* leg of the 3rd pair, × $7^1/_2$; 104*f* dactylus of this leg, × 25. (All the figures are taken from the male).

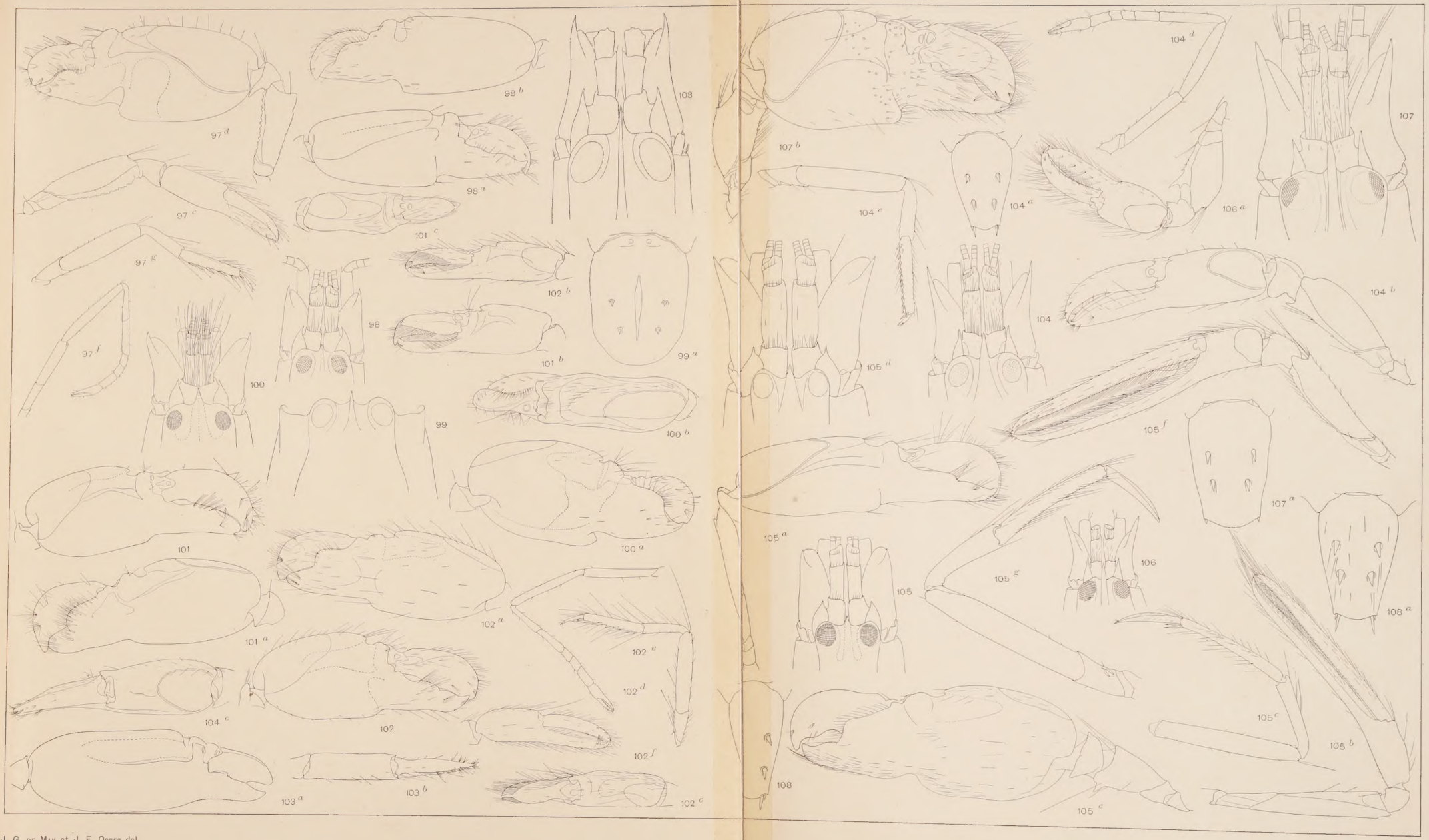
Fig. 105. *Alpheus malabaricus* (Fabr.) Henderson var. *leptopus* de Man, frontal and antennal region of the ova-bearing female from Stat. 19, × $8^1/_2$; 105*a* and 105*b* large and small cheliped of this female, outer side, × 10; 105*c* leg of the 3rd pair of this female, × 10.

Fig. 105*d*. *Alpheus malabaricus* (Fabr.) Henderson var. *dolichodactylus* Ortm., frontal and antennal region of the female with eggs, long 34 mm., from Sagami Bay, Japan (N° 6 of the Tables of measurements), × 10; 105*e*, large cheliped, inner side, of the adult male from Sagami Bay, Japan (N° 5 of the Tables of measurements), × 5; 105*f* small cheliped of the female, outer side, × 7; 105*g* leg of the 3rd pair of the female, × $9^1/_2$.

Fig. 106. *Alpheus parvirostris* Dana, frontal and antennal region of the ova-bearing female from Stat. 91, × 10; 106*a* small cheliped, outer side, of the male from Stat. 93, × 20.

Fig. 107. *Alpheus edamensis* de Man, frontal and antennal region of the adult male from Stat. 78, × 8; 107*a* telson of this specimen, × 8; 107*b* large cheliped of this male, outer side, × 4.

Fig. 108. *Alpheus* sp., telson of the female from Stat. 33, × 25; 108*a* telson of a female of equal size of *Alpheus parvirostris* Dana from Stat. 91, × 25.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